

March 20, 2015

Mr. James Johnson On-Scene Coordinator U.S. Environmental Protection Agency, Region 7 11201 Renner Boulevard Lenexa, Kansas 66219

Subject: Data Deliverable Package 09

West Lake Landfill Site, Bridgeton, Missouri

CERCLIS ID: MOD079900932

EPA Region 7, START 4, Contract No. EP-S7-13-06, Task Order No. 0058

Task Monitor: James Johnson, On-Scene Coordinator

Dear Mr. Johnson:

Tetra Tech, Inc. is submitting the following analytical laboratory reports with associated data validation reports for sampling at locations off-site of the West Lake Landfill Site in Bridgeton, Missouri.

Sample Delivery Group	Analysis Type	Sample Collection Date
J10181	Gamma scan and gross alpha/beta	01/14/2015
J10273	Gamma scan and gross alpha/beta	01/21/2015
J10333	Alpha-emitting Ra and Isotopic U/Th	01/28/2015
J10418	Alpha-emitting Ra and Isotopic U/Th/	
	Gamma scan and gross alpha/beta	02/04/2015
J10545	Gamma scan and gross alpha/beta	02/11/2015
J10616	Gamma scan and gross alpha/beta	02/18/2015
J10707	Gamma scan and gross alpha/beta	02/25/2015
60186505	Volatile Organic Compounds	01/19/2015
60187573	Volatile Organic Compounds	02/04/2015
60188142	Volatile Organic Compounds	02/13/2015
P1500074	Hydrogen Sulfide	01/05/2015
P1500645	Hydrogen Sulfide	02/13/2015
P1500733	Hydrogen Sulfide	02/20/2015

If you have any questions or comments, please contact Rob Monnig at (816) 412-1775.

Sincerely,

for Dave Kinroth

START Project Manager

Ted Faile, PG, CHMM START Program Manager

Enclosures

cc: Debra Dorsey, START Project Officer (cover letter only)

415 Oak Street, Kansas City, MO 64106 Tel 816.412.1741 Fax 816.410.1748 www.tetratech.com

X9025.14.0058.000

Tetra Tech, Inc. DATA VALIDATION REPORT LEVEL II

Site:

103I9025140058.000

West Lake Landfill Site, Bridgeton, Missouri

Laboratory:	TestAmerica Laboratories, Inc. (Earth City, Missouri)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	March 11, 2015
Sample Delivery Group (SDG):	J10181
Sample Numbers:	WAA-01-AF-PS-20150114, WAA-02-AF-PS-20150114, WAA-03-AF-PS-20150114, WAA-04-AF-PS-20150114, WAA-05-AF-PS-20150114, and WAA-00-AF-FB-20150114
Matrix / Number of Samples:	5 Air Samples and 1 Field Blank
documents entitled "Contract Labor Methods Data Review" (9240.1-48) Packages from Subcontracted Labo Agency Radiological Laboratory Arcriteria specified in the applicable in The review was intended to identify apparent from the summary data pathat were found, and data qualificat limited to the available field and lab package. I, Harry Ellis, certify that all data variables.	problems and quality control (QC) deficiencies that were readily ckage. The following sections discuss any problems or deficiencies ions applied because of non-compliant QC. The data review was coratory QC information submitted with the project-specific data alidation criteria outlined in the above-referenced documents were de to the data accorded with those documents.

1

SDG J10181

DATA VALIDATION QUALIFIERS

- U The analyte was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported sample quantitation limit, which is estimated.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

103J9025140058.000 2 SDG J10181

DATA ASSESSMENT

Sample delivery group (SDG) J10181 included five (5) environmental air (filter) samples and one (1) QC samples (a field blank). Samples were analyzed for gross alpha and beta radiation by EPA SW-846 Method 9310 and for cesium-137 and other gamma-emitters by Department of Energy (DOE) Method Ga-01-R. The following summarizes the data validation that was performed.

RADIOANALYTICAL ANALYSES

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 6 months from sample collection to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. LCS and duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blank yielded low alpha and beta activities and the field blank slightly higher beta activity, but no detectable alpha activity. The laboratory blank rarely yields detectable activities; no qualifications were applied for it. The other field samples yielded more than 10 times the field blank beta activity, so no qualifications were applied.

IV. Laboratory Control Sample (LCS)

All percent recoveries from the LCS analyses were within established control limits. No qualifications were applied.

V. Surrogates

Surrogates are not used in these radioanalytical methods.

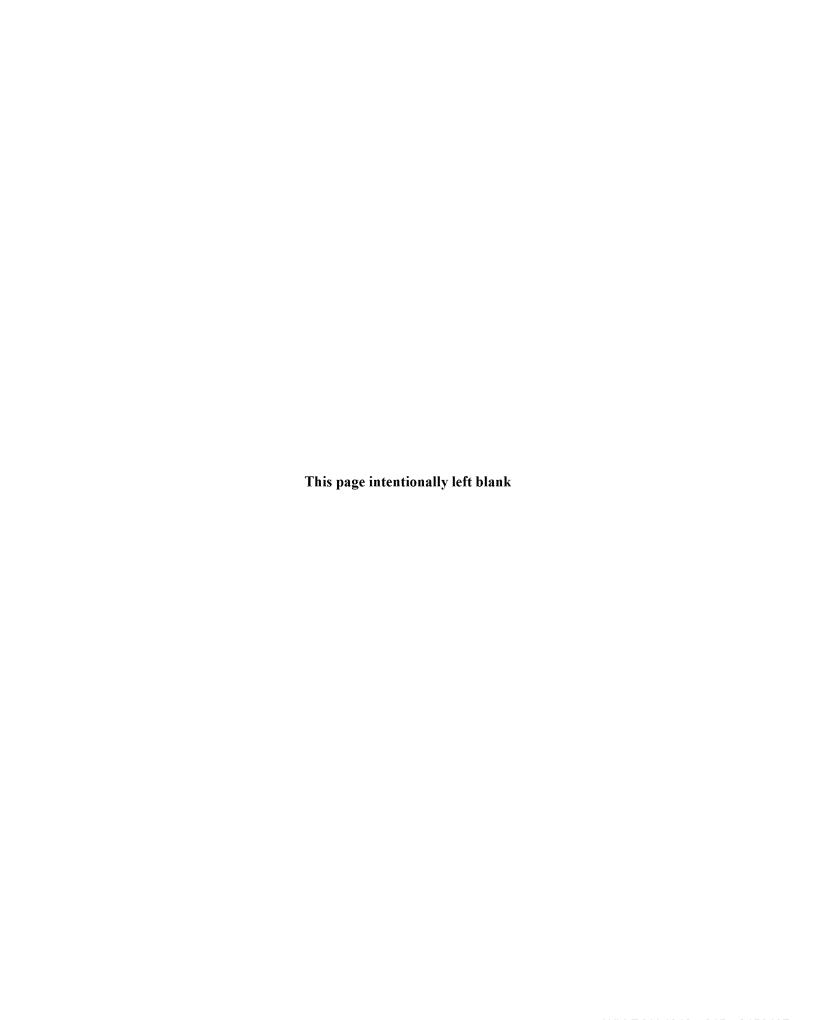
VI. Comments

Some detected activities were less than their reporting limits ("RL"). These extrapolations should be qualified as estimated (flagged "J").

VII. Overall Assessment of Data

Overall data quality is acceptable, with no significant qualifications applied. All data are usable as qualified for their intended purposes.

103J9025140058.000 3 SDG J10181



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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis 13715 Rider Trail North Earth City, MO 63045 Tel: (314)298-8566

TestAmerica Job ID: 160-10181-2

Client Project/Site: West Lake Landfill - Filters

For:

Tetra Tech EM Inc. 415 Oak Street Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Rhonda Ridenhouer

Authorized for release by: 1/29/2015 10:36:54 AM

Rhonda Ridenhower, Manager of Project Management rhonda.ridenhower@testamericainc.com

Designee for

Erika Gish, Project Manager II (314)298-8566

erika.gish@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

WLLFOIA4312 - 015 - 0156198

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Case Narrative

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

Job ID: 160-10181-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: West Lake Landfill - Filters

Report Number: 160-10181-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 01/19/2015; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 20.0 C.

GROSS ALPHA AND GROSS BETA RADIOACTIVITY

Samples WAA-01-AF-PS-20150114 (160-10181-1), WAA-02-AF-PS-20150114 (160-10181-2), WAA-03-AF-PS-20150114 (160-10181-3), WAA-04-AF-PS-20150114 (160-10181-4), WAA-05-AF-PS-20150114 (160-10181-5) and WAA-00-AF-FB-20150114 (160-10181-6) were analyzed for Gross Alpha and Gross Beta Radioactivity in accordance with SW846 9310. The samples were prepared on 01/22/2015 and analyzed on 01/23/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 & OTHER GAMMA EMITTERS (GS)

Samples WAA-01-AF-PS-20150114 (160-10181-1), WAA-02-AF-PS-20150114 (160-10181-2), WAA-03-AF-PS-20150114 (160-10181-3), WAA-04-AF-PS-20150114 (160-10181-4), WAA-05-AF-PS-20150114 (160-10181-5) and WAA-00-AF-FB-20150114 (160-10181-6) were

TestAmerica St. Louis

TestAmerica Job ID: 160-10181-2

Case Narrative

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

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Job ID: 160-10181-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

analyzed for Radium-226 & Other Gamma Emitters (GS) in accordance with GA-01-R. The samples were prepared and analyzed on 01/22/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TestAmerica St. Louis

TestAmerica Job ID: 160-10181-2

TestAmerica St. Louis

Chain of Custody Record

13715 Rider Trail North

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TestAmerica

Earth City, MO 63045	_																			11	HE LEADER I	N ENVIR	ONMEN	TAL TES	TING
phone 314.298.8566 fax			gram: [NPDES		RCR			Other:										٦	ΓestAmer	ica La	borat	ories,	Inc.
Client Contact			ave Kinrot	h		Site	e Con	ntaci	: Da	ave F	(inro	th		Date	: 1-1	9-15				CC	OC No:	·		*******	
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Sample Identification	Sample Date	Sample Time	Type (C=Comp, G=Grab)	Matrix	# of Cont.		Perform MS / MSD (Y 9310 Gross Alpha/Beta	GA-01-R Gamm Spec	9315 Total Alpha Radium	A-01-R Isotopic Thorium	A-01-R Isotopic Uranium										Samp	ole Spe	cific No	otes:	
WAA-01-AF-PS-20150114	1/14/15	11:25	Filter	Air	. 1	П	Х	x	х	Х	хх									* 9	315 Radiu				目
WAA-02-AF-PS-20150114	1/14/15	10:15	Filter	Air	11		х	x	х	Х	хх	(co	ntingent up	on TA	R resu	its	\neg
WAA-03-AF-PS-20150114	1/14/15	· 10:47	Filter	Air	1	Ц	X	x	х	х	хх									for	all sample	3 S	***************************************		
WAA-04-AF-PS-20150114	1/14/15	11:06	Filter	. Àir	1	Ц	X	X	х	х	хх								\prod						\neg
WAA-05-AF-PS-20150114	1/14/15	10:30	Filter	Air	1	Ш	Х	х	х	Х	x x					T						-	≈ ==		_1
WAA-00-AF-FB-20150114	1/14/15	NA	Filter	Air	1		х	x	х	X	хx				T		П					1	ŏ-1		≣
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Preservation Used: 1= lce; 2= HCl; 3= H2SO4; 4=HNO3; 5=	NaOH; 6=	Other																30 00			1.000				≣∣
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please I Comments Section if the lab is to dispose of the sample.	ist any EP	A Waste Co	odes for the	sample	in the	Š,	Samp	ole C	ispo	osal ((Afe	e m	ay be	ass	esse	d if s	ampl	es ar	e retai	ined k	onger than	<u>1</u>			Afternoon and a
☑Non-Hazard ☐ Hammable ☐ Skin Irritant	Poison	В	Unkno	wn				Retur	n to Cl	lient			Dis	posal b	y Lab			Arch	ive for_		Months				-
Special Instructions/QC Requirements & Comments:					,							-													
Custody Seals Infact: Yes No	Custody S	eal No.:							Coc	oler T	emp.	. (°C)	: Obs	'd:		C	orr'd:			Ther	m ID No.:				\dashv
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Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc. Job Number: 160-10181-2

Login Number: 10181 List Source: TestAmerica St. Louis

List Number: 1 Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10181-2

Qualifiers

Rad

Qualifier Qualifier Description

U Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid

CFL Contains Free Liquid
CNF Contains no Free Liquid

DER Duplicate error ratio (normalized absolute difference)

Dil Fac Dilution Factor

DL, RA, RE, IN Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample

DLC Decision level concentration

MDA Minimum detectable activity

EDL Estimated Detection Limit

MDC Minimum detectable concentration

MDL Method Detection Limit
ML Minimum Level (Dioxin)

NC Not Calculated

ND Not detected at the reporting limit (or MDL or EDL if shown)

PQL Practical Quantitation Limit

QC Quality Control
RER Relative error ratio

RL Reporting Limit or Requested Limit (Radiochemistry)

RPD Relative Percent Difference, a measure of the relative difference between two points

TEF Toxicity Equivalent Factor (Dioxin)
TEQ Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10181-2

Method	Method Description	Protocol	Laboratory		
9310	Gross Alpha / Beta (GFPC)	SW846	TAL SL		
GA-01-R	Cesium-137 & Other Gamma Emitters (GS)	DOE	TAL SL		

Protocol References:

DOE = U.S. Department of Energy

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10181-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-10181-1	WAA-01-AF-PS-20150114	Filter	01/14/15 11:25	01/19/15 11:00
160-10181-2	WAA-02-AF-PS-20150114	Filter	01/14/15 10:15	01/19/15 11:00
160-10181-3	WAA-03-AF-PS-20150114	Filter	01/14/15 10:47	01/19/15 11:00
160-10181-4	WAA-04-AF-PS-20150114	Filter	01/14/15 11:06	01/19/15 11:00
160-10181-5	WAA-05-AF-PS-20150114	Filter	01/14/15 10:30	01/19/15 11:00
160-10181-6	WAA-00-AF-FB-20150114	Filter	01/14/15 00:00	01/19/15 11:00

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10181-2

Lab Sample ID: 160-10181-1

Matrix: Filter

Client Sample ID: WAA-01-AF-PS-20150114

Date Collected: 01/14/15 11:25 Date Received: 01/19/15 11:00

Method: 9310 - Gr	ross Alpha / Beta (GFPC)								
		Count	Total						
		Uncert.	Uncert.						
Analyte	Result Qualifier	(20+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.363 🗸	0.277	0.280	(m)	0.385	pCi/Sample	01/22/15 09:13	01/23/15 08:02	1
Gross Beta	17.0	1.15	2.05	10.0	0.371	pCi/Sample	01/22/15 09 13	01/23/15 08:02	1
Method: GA-01-R	- Cesium-137 & Other Gar	nma Emitters	s (GS)						
		Count	Total						
		Uncert.	Uncert.						
Analyte	Result Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	0.612	4.57	4.57	(20.0)	8 40	nCi/Sample	01/22/15 09:16	01/22/15 22:07	***************************************

Total

Uncert.

 $(2\sigma + /-)$

36.2

RL

MDC Unit

25.4 pCi/Sample

pCi/Sample

Count

Uncert.

 $(2\sigma + /-)$

34.8

Client Sample ID: WAA-02-AF-PS-20150114

Result Qualifier

99,2

Date Collected: 01/14/15 10:15

Other Detected

Radionuclides

Be-7

Date Received: 01/19/15 11:00

Lab Sample ID: 160-10181-2

Analyzed

01/22/15 22:07

Prepared

01/22/15 09:16

Matrix: Filter

Dil Fac

Method: 9310 - Gros	s Alpha / Be	ta (GFPC)								
A 1 - 4 -			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.373	المشر	0.253	0.256	10.0	0.329	pCi/Sample	01/22/15 09:13	01/23/15 08:02	1
Gross Beta	15.7		1,12	1.93	10,0	0.423	pCi/Sample	01/22/15 09:13	01/23/15 08:02	1
Method: GA-01-R - C			Count Uncert.	Total Uncert.						
Analyte		Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	2,01	W	3.23 Count	3.24 Total	(20.0)	5.52	pCi/Sample	01/22/15 09:16	01/22/15 22:11	1
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(2σ+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac

Client Sample ID: WAA-03-AF-PS-20150114

None

Date Collected: 01/14/15 10:47

Other Detected

Radionuclide

Date Received: 01/19/15 11:00

Lab Sample ID: 160-10181-3

01/22/15 09:16 01/22/15 22:11

Matrix: Filter

Method: 9310 - Gro	oss Alpha / Be	ta (GFPC)								
	-	,	Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.424		0.284	0.288	10.0	0.384	pCi/Sample	01/22/15 09 13	01/23/15 09 35	1
Gross Beta	17.4		1.18	2.10	10,0	0.412	pCi/Sample	01/22/15 09,13	01/23/15 09:35	1

HUE

11 March 2815

TestAmerica St. Louis

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1/29/2015

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10181-2

Lab Sample ID: 160-10181-3

Matrix: Fifter

Client Sample ID: WAA-03-AF-PS-20150114
Date Collected: 01/14/15 10:47

Date Received: 01/19/15 11:00

			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/ -)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	0.0711	W	5.10	5,10	20.0	9,52	pCi/Sample	01/22/15 09:16	01/22/15 22:09	1
			Count	Total						
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Be-7	111	control and an annual factoring.	48.2	49.5	Line on Sept. (1986) " Token Sept.	47.8	pCi/Sample	01/22/15 09:16	01/22/15 22 09	1

Client Sample ID: WAA-04-AF-PS-20150114

Date Collected: 01/14/15 11:06

Date Received: 01/19/15 11:00

Lab	Sample	ID:	160-1	01	81-4	
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Matrix: Filter

Method: 9310 - Gro	ss Alpha / Be	ta (GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.770		0.325	0.336	10.0	0.316	pCi/Sample	01/22/15 09:13	01/23/15 08:02	1
Gross Beta	18.3		1.19	2.18	10.0	0,354	pCi/Sample	01/22/15 09:13	01/23/15 08:02	1
Method: GA-01-R -	Cesium-137 &	k Other Gan	nma Emitters	s (GS)						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-1.72	67	5.86	5.87	20.0	10.5	pCi/Sample	01/22/15 09:16	01/22/15 22:07	hi e shahiinteen titaan qaa

Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-1.72	C/	5.86	5.87	20.0	10.5	pCi/Sample	01/22/15 09:16	01/22/15 22 07	1
			Count	Total						
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(2σ+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None	ndalis-delenanciani distribution			**************************************		pCi/Sample	01/22/15 09:16	01/22/15 22:07	1
Radionuclide										

Client Sample ID: WAA-05-AF-PS-20150114

-0.765

Date Collected: 01/14/15 10:30

Date Received: 01/19/15 11:00

Cesium-137

.ab	San	npie	ID:	160-	101	181-5	
-----	-----	------	-----	------	-----	-------	--

01/22/15 09:16

Matrix: Filter

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.530	and the second	0.266	0.273	10.0	0.272	pCi/Sample	01/22/15 09 13	01/23/15 08 02	1
Gross Beta	14.3		1.04	1.77	10.0	0.333	pCi/Sample	01/22/15 09 13	01/23/15 08.02	1
Method: GA-01-R	- Cesium-137 8	& Other Gan	nma Emitters	s (GS)						
			Count	Total						
			Uncert.	Uncert.						

AUG 11 Han 15

7,07

7.07

20.0

13.0 pCi/Sample

TestAmerica St. Louis

01/22/15 22:08

1/29/2015

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10181-2

Client Sample ID: WAA-05-AF-PS-20150114

Date Collected: 01/14/15 10:30 Date Received: 01/19/15 11:00 Lab Sample ID: 160-10181-5

Matrix: Filter

			Count	Total						
Other Detected			Uncert	Uncert.						
Radionuclides	Result	Qualifier	(2σ+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None	-warrante no warrante en (SMC (- vit).	· · · · · · · · · · · · · · · · · · ·	ight felocolom risemble organish of hills for continue throad ,	Medicina de Madro casa, y arra sados -	pranamation of the season of the property of the party.	pCi/Sample	01/22/15 09 16	01/22/15 22:08	And the second second second second
Radionuclide										

Client Sample ID: WAA-00-AF-FB-20150114

Date Collected: 01/14/15 00:00

Date Received: 01/19/15 11:00

Lab Sample ID: 160-10181-6

Matrix: Filter

Method: 9310 - Gro	ss Alpha / Be	ta (GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.190	W	0.189	0.190	(10.0)	0.281	pCi/Sample	01/22/15 09:13	01/23/15 08:03	1
Gross Beta	1.12	Trans	0.340	0.358	10.0	0.350	pCi/Sample	01/22/15 09:13	01/23/15 08:03	1
Method: GA-01-R -	Cesium-137 8	& Other Gan	nma Emitters	; (GS)						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(20+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-0.183	لع	4.94	4.94	20,0	9.65	pCi/Sample	01/22/15 09:16	01/22/15 23:12	1
			Count	Total						
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(20+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None	4485 202 0005 00002.g-00444	and an analysis of the second	And the second s	eggegggenç regjeniygenin		pCi/Sample	01/22/15 09:16	01/22/15 23:12	1

HV6 11 Man 15

QC Sample Results

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

Method: 9310 - Gross Alpha / Beta (GFPC)

Lab Sample ID: MB 160-169724/1-A Client Sample ID: Method Blank

Matrix: Filter

Analysis Batch: 170022

Count

Prep Type: Total/NA Prep Batch: 169724

Uncert. MB MB Uncert. Qualifier (2σ+/-) RL MDC Unit Prepared Dil Fac Analyte Result (2σ+/-) Analyzed Gross Alpha 0.4668 0.276 0.281 10.0 0.338 pCi/Sample 01/22/15 09:13 01/23/15 08:01 Gross Beta 0.280 0.288 0.338 pCi/Sample 01/22/15 09:13 01/23/15 08:01 0.6448 10.0

Total

Lab Sample ID: LCS 160-169724/2-A Client Sample ID: Lab Control Sample

Matrix: Filter

Analysis Batch: 170022

Prep Type: Total/NA

TestAmerica Job ID: 160-10181-2

Prep Batch: 169724

Total LCS LCS Spike Uncert. %Rec. Analyte Added Result Qual $(2\sigma + / -)$ RL MDC Unit %Rec Limits Gross Alpha 5.37 4.691 0.921 10.0 0.380 pCi/Samp 87 75 - 125

Lab Sample ID: LCSB 160-169724/3-A Client Sample ID: Lab Control Sample

Matrix: Filter

Analysis Batch: 170022

Prep Type: Total/NA Prep Batch: 169724

Total

Spike LCSB LCSB Uncert. %Rec. Added RL Analyte Result Qual $(2\sigma + / -)$ MDC Unit %Rec Limits Gross Beta 17.9 17.74 2.13 10.0 0.357 pCi/Samp 99 75 - 125

Lab Sample ID: 160-10181-1 DU Client Sample ID: WAA-01-AF-PS-20150114

Matrix: Filter

Analysis Batch: 170022

Prep Type: Total/NA

Prep Batch: 169724

Total Sample Sample DU DU Uncert. RER Analyte Result Qual Result Qual $(2\sigma + / -)$ RL MDC Unit RER Limit Gross Alpha 0.363 U 0.6251 0.312 10.0 0.329 pCi/Samp 0.44 Gross Beta 17.0 17.99 2.16 10.0 0.423 pCi/Samp 0.23

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-169725/1-A Client Sample ID: Method Blank

Matrix: Filter

Analysis Batch: 169802

Prep Type: Total/NA

Prep Batch: 169725 Total Count MB MB Uncert. Uncert. Analyte Result Qualifier $(2\sigma + / -)$ $(2\sigma + / -)$ RL MDC Unit Prepared Analyzed Dil Fac -3.475 U 24.4 Cesium-137 24 4 20.0 01/22/15 09:16 01/22/15 22:10 15.5 pCi/Sample Count Total Other Detected MB MB Uncert. Uncert. Radionuclides Result Qualifier $(2\sigma +/-)$ $(2\sigma + / -)$ RL MDC Unit Prepared Analyzed Dil Fac None 01/22/15 09:16 01/22/15 22:10 Other Detected pCi/Sample Radionuclide

QC Sample Results

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10181-2

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-169725/2-A Client Sample ID: Lab Control Sample

Matrix: Filter

Analysis Batch: 169804

Prep Type: Total/NA Prep Batch: 169725

Total LCS LCS %Rec. Spike Uncert. Analyte Added Result Qual (2σ+/-) RL MDC Unit %Rec 119 pCi/Samp Americium-241 32000 30280 3150 95 87 ₋ 116 10290 1080 Cesium-137 11100 20.0 69.8 pCi/Samp 93 87 - 120 Cobalt-60 11800 11430 1160 35.5 pCi/Samp 87 _ 115

Lab Sample ID: 160-10181-1 DU Client Sample ID: WAA-01-AF-PS-20150114

Matrix: Filter

Prep Type: Total/NA

: 169813								Prep Batch: 1	69725
				Total					
Sample	Sample	DU	DU	Uncert.					RER
Result	Qual	Result	Qual	(2σ+/-)	RL	MDC	Unit	RER	Limit
0.612	U	-0.6624	U	6.58	20.0	11.8	pCi/Samr	0.11	1
				Total					
Sample	Sample	DU	DU	Uncert.					RER
Result	Qual	Result	Qual	(2σ+/-)	RL	MDC	Unit	RER	Limit
99.2		120.7		40.5		26.2	pCi/Samr	0.28	
	Result 0.612 Sample Result	Sample Sample Result Qual 0.612 U Sample Sample Result Qual	Sample Sample DU Result Qual Result 0.612 U -0.6624 Sample Sample DU Result Qual Result	Sample Sample DU DU Result Qual Result Qual 0.612 U -0.6624 U Sample Sample DU DU Result Qual Result Qual	Sample Sample DU DU Uncert.	Sample Sample DU DU Uncert.	Sample Sample DU DU Uncert. Result Qual Qual Qσ+/-) RL MDC MDC	Sample Sample DU DU Uncert.	Sample Sample DU DU Uncert. Hesult Qual Result Qual (2σ+/-) RL MDC Unit RER 0.612 U -0.6624 U 6.58 20.0 11.8 pCi/Sam; 0.11 Total Sample Sample DU DU Uncert. Result Qual (2σ+/-) RL MDC Unit RER

QC Association Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10181-2

100000		
	43	м

Prep Batch: 169724

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10181-1	WAA-01-AF-PS-20150114	Total/NA	Filter	None	_
160-10181-1 DU	WAA-01-AF-PS-20150114	Total/NA	Filter	None	
160-10181-2	WAA-02-AF-PS-20150114	Total/NA	Filter	None	
160-10181-3	WAA-03-AF-PS-20150114	Total/NA	Filter	None	
160-10181-4	WAA-04-AF-PS-20150114	Total/NA	Filter	None	
160-10181-5	WAA-05-AF-PS-20150114	Total/NA	Filter	None	
160-10181-6	WAA-00-AF-FB-20150114	Total/NA	Filter	None	
LCS 160-169724/2-A	Lab Control Sample	Total/NA	Filter	None	
LCSB 160-169724/3-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-169724/1-A	Method Blank	Total/NA	Filter	None	

Prep Batch: 169725

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10181-1	WAA-01-AF-PS-20150114	Total/NA	Filter	None	
160-10181-1 DU	WAA-01-AF-PS-20150114	Total/NA	Filter	None	
160-10181-2	WAA-02-AF-PS-20150114	Total/NA	Filter	None	
160-10181-3	WAA-03-AF-PS-20150114	Total/NA	Filter	None	
160-10181-4	WAA-04-AF-PS-20150114	Total/NA	Filter	None	
160-10181-5	WAA-05-AF-PS-20150114	Total/NA	Filter	None	
160-10181-6	WAA-00-AF-FB-20150114	Total/NA	Filter	None	
LCS 160-169725/2-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-169725/1-A	Method Blank	Total/NA	Filter	None	

Tetra Tech, Inc. DATA VALIDATION REPORT LEVEL II

Site:	West Lake Landfill Site, Bridgeton, Missouri
Laboratory:	TestAmerica Laboratories, Inc. (Earth City, Missouri)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	March 11, 2015
Sample Delivery Group (SDG):	J10273
Sample Numbers:	WAA-01-AF-PS-20150121, WAA-02-AF-PS-20150121, WAA-03-AF-PS-20150121, WAA-04-AF-PS-20150121, WAA-05-AF-PS-20150121, and WAA-00-AF-FB-20150121
Matrix / Number of Samples:	5 Air Samples and 1 Field Blank
Packages from Subcontracted Labor Agency Radiological Laboratory Arcriteria specified in the applicable number The review was intended to identify apparent from the summary data pathat were found, and data qualificate limited to the available field and lab package.	problems and quality control (QC) deficiencies that were readily ckage. The following sections discuss any problems or deficiencies ions applied because of non-compliant QC. The data review was poratory QC information submitted with the project-specific data
	alidation criteria outlined in the above-referenced documents were de to the data accorded with those documents.
Hang N. Elli	11 March 2015
Certified by Harry Ellis, Chemist	Date

103I9025140058.000 1 SDG J10273

DATA VALIDATION QUALIFIERS

- U The analyte was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported sample quantitation limit, which is estimated.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

DATA ASSESSMENT

Sample delivery group (SDG) J10273 included five (5) environmental air (filter) samples and one (1) QC samples (a field blank). Samples were analyzed for gross alpha and beta radiation by EPA SW-846 Method 9310 and for cesium-137 and other gamma-emitters by Department of Energy (DOE) Method Ga-01-R. The following summarizes the data validation that was performed.

RADIOANALYTICAL ANALYSES

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 6 months from sample collection to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. LCS and duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blank yielded no detectable activities and the field blank a low beta activity. The other field samples yielded more than 5 times the field blank beta activity, so no qualifications were applied.

IV. Laboratory Control Sample (LCS)

All percent recoveries from the LCS analyses were within established control limits. No qualifications were applied.

V. Surrogates

Surrogates are not used in these radioanalytical methods.

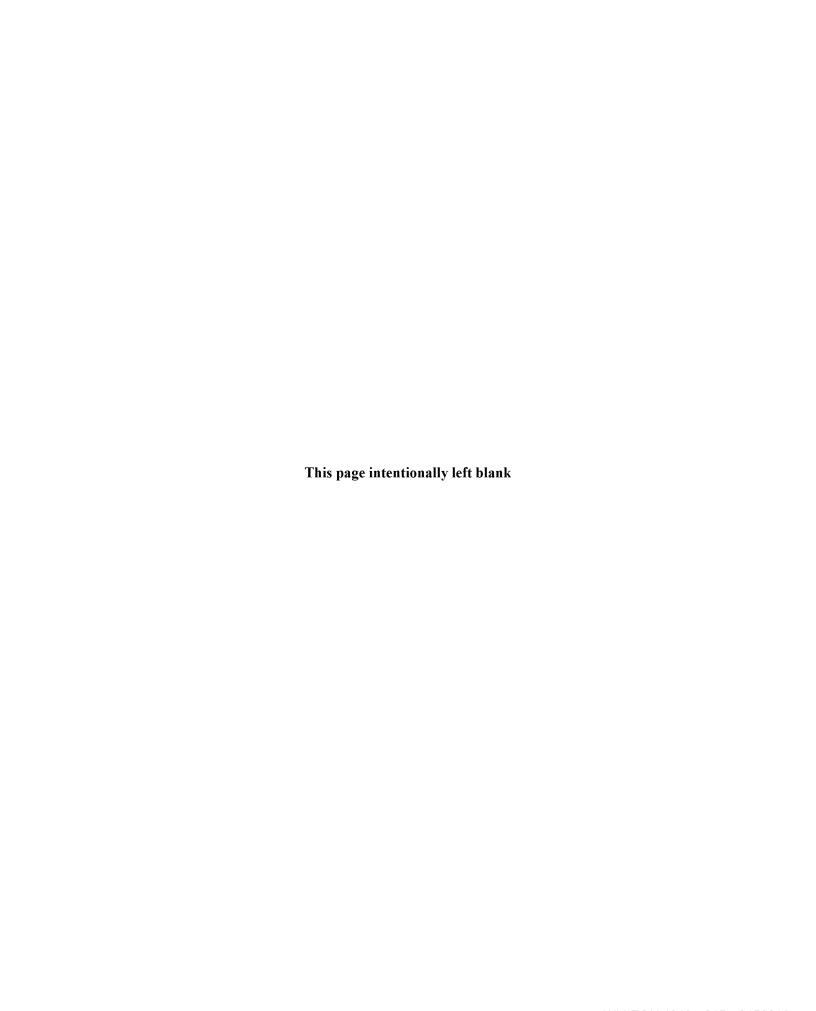
VI. Comments

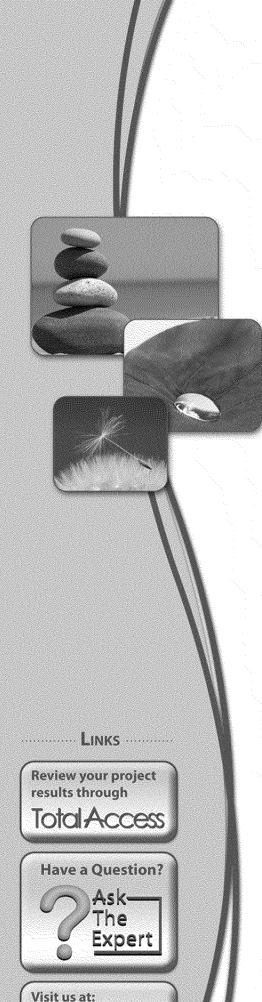
Some detected activities were less than their reporting limits ("RL"). These extrapolations should be qualified as estimated (flagged "J").

VII. Overall Assessment of Data

Overall data quality is acceptable, with no significant qualifications applied. All data are usable as qualified for their intended purposes.

103J9025140058,000 3 SDG J10273





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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis 13715 Rider Trail North Earth City, MO 63045 Tel: (314)298-8566

TestAmerica Job ID: 160-10273-2

Client Project/Site: West Lake Landfill - Filters

For:

Tetra Tech EM Inc. 415 Oak Street Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Authorized for release by: 1/30/2015 4:40:42 PM

Erika Gish, Project Manager II (314)298-8566 erika.gish@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

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Case Narrative

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10273-2

Job ID: 160-10273-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: West Lake Landfill - Filters

Report Number: 160-10273-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 1/26/2015 11:30 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 18.0° C.

GROSS ALPHA AND GROSS BETA RADIOACTIVITY

Samples WAA-01-AF-PS-20150121 (160-10273-1), WAA-02-AF-PS-20150121 (160-10273-2), WAA-03-AF-PS-20150121 (160-10273-3), WAA-04-AF-PS-20150121 (160-10273-4), WAA-05-AF-PS-20150121 (160-10273-5) and WAA-00-AF-FB-20150121 (160-10273-6) were analyzed for Gross Alpha and Gross Beta Radioactivity in accordance with SW846 9310. The samples were prepared and analyzed on 01/29/2015.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

RADIUM-226 & OTHER GAMMA EMITTERS (GS)

Samples WAA-01-AF-PS-20150121 (160-10273-1), WAA-02-AF-PS-20150121 (160-10273-2), WAA-03-AF-PS-20150121 (160-10273-3), WAA-04-AF-PS-20150121 (160-10273-4), WAA-05-AF-PS-20150121 (160-10273-5) and WAA-00-AF-FB-20150121 (160-10273-6) were

Case Narrative

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

.

Job ID: 160-10273-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

analyzed for Radium-226 & Other Gamma Emitters (GS) in accordance with GA-01-R. The samples were prepared and analyzed on 01/29/2015.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

TestAmerica St. Louis

TestAmerica Job ID: 160-10273-2

TestAmerica St. Louis

Chain of Custody Record

13715 Rider Trail North

TestAmerica

Earth City, MO 63045 phone 314.298.8566 fax Regulatory Program: DW ☐ NPDES RCRA Other: TestAmerica Laboratories, Inc. Client Contact Project Manager: Dave Kinroth Site Contact: Dave Kinroth Date: 1-26-15 COC No: Tetra Tech, Inc. Tel/Fax: 314-517-6798 ab Contact: Mike Franks Carrier: NA COCs 415 Oak Street **Analysis Turnaround Time** Sampler: Kansas City, MO 64106 CALENDAR DAYS WORKING DAYS For Lab Use Only: (816) 412-1786 Phone TAT if different from Below Walk-in Client: 9315 Radium-226 (GFPC) (816) 816-410-1748 FAX 9315 Total Alpha Radium 2 weeks A-01-R Isotopic Uranium Lab Sampling: Project Name: West Lake Landfill Site 1 week Site: Bridgeton, MO 2 days Job / SDG No.: PO# 1105610 1 day Sample A-01-R Type Sample Sample (C=Comp, Date Sample Identification Time G=Grab) Matrix Cont. Sample Specific Notes: WAA-01-AF-PS-20150121 1/21/15 11:22 Filter Air 9315 Radium-226 (GFPC) WAA-02-AF-PS-20150121 1/21/15 10:15 Filter Air $X \mid X$ Х contingent upon TAR results 1/21/15 WAA-03-AF-PS-20150121 10:53 Х $x \mid x$ Χ for all samples Filter Air 1/21/15 WAA-04-AF-PS-20150121 11:08 Filter Air X WAA-05-AF-PS-20150121 1/21/15 10:31 Filter Air x x Χ WAA-00-AF-FB-20150121 1/21/15 Х Х NA Filter Air Х Preservation Used: 1= ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other Possible Hazard Identification: Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample. ✓ Non-Hazard Hammable Skin Irritant Poison B Unknown Return to Client Disposal by Lab __Archive for__ Months Special Instructions/QC Requirements & Comments: Custody Seal No.: Custody Seals Intact: Cooler Temp. (°C): Obs'd: Corr'd: Therm ID No.: Relinguished by Company: Date/Time: Received by: Company: Date/Time: Tech 1-26-19511:30 14 Tetra 11201 1130 Relinguished by: Company: Date/Time: Received by: Company: Date/Time: Relinquished by: Date/Time: Company: Received in Laboratory by: Company: Date/Time:

Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc.

Job Number: 160-10273-2

Login Number: 10273 List Source: TestAmerica St. Louis

List Number: 1

Creator: Daniels, Brian J

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10273-2

Qualifiers

Rad

RL

RPD

TEF

TEQ

Qualifier Qualifier Description

U Result is less than the sample detection limit.

Reporting Limit or Requested Limit (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

Relative Percent Difference, a measure of the relative difference between two points

Glossary

Glossary	
Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio

Method Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10273-2

Method	Method Description	Protocol	Laboratory
9310	Gross Alpha / Beta (GFPC)	SW846	TAL SL
GA-01-R	Cesium-137 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10273-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-10273-1	WAA-01-AF-PS-20150121	Filter	01/21/15 11:22	01/26/15 11:30
160-10273-2	WAA-02-AF-PS-20150121	Filter	01/21/15 10:15	01/26/15 11:30
160-10273-3	WAA-03-AF-PS-20150121	Filter	01/21/15 10:53	01/26/15 11:30
160-10273-4	WAA-04-AF-PS-20150121	Filter	01/21/15 11:08	01/26/15 11:30
160-10273-5	WAA-05-AF-PS-20150121	Filter	01/21/15 10:31	01/26/15 11:30
160-10273-6	WAA-00-AF-FB-20150121	Filter	01/21/15 00:00	01/26/15 11:30

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10273-2

Client Sample ID: WAA-01-AF-PS-20150121	Lab Sample ID: 160-10273-1
Date Collected: 01/21/15 11:22	Matrix: Filter
Date Received: 01/26/15 11:30	

Method: 9310 - Gro	ss Alpha / Be	ta (GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.503	annia.	0.305	0.310	10.0	0.392	pCi/Sample	01/29/15 11:43	01/29/15 12:21	1
Gross Beta	18.1		1.19	2.17	10.0	0.361	pCi/Sample	01/29/15 11:43	01/29/15 12:21	1
Method: GA-01-R -	Cesium-137 8	& Other Gar	nma Emitters	(GS)						
			Count	Total						
			Uncert.	Uncert.						
Analyte		Qualifier	(2σ+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	2.53	W	4.66	4.67	20.0	8.05	pCi/Sample	01/29/15 11:46	01/29/15 17:10	1
			Count	Total						
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None	- 64-sakkhattissever vilgertalmiterisiki iz ejapter J	alabo opini menimi meni	makedikk-rimeningingan-gagai saara raar	termin era utermineraturum kolonikus (kolonikus)	THE RESIDENCE OF THE PROPERTY	pCi/Sample	01/29/15 11:46	01/29/15 17:10	1

Client Sample ID: WAA-02-AF-PS-20150121 Lab Sample ID: 160-10273-2

Date Collected: 01/21/15 10:15 Date Received: 01/26/15 11:30

Matrix: Filter

Method: 9	310 - Gross Alpha / Be	ta (GFPC)	Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0,331	V	0.259	0.261	(10.0)	0.366	pCi/Sample	01/29/15 11:43	01/29/15 12:21	DII Fac
Gross Beta	15.7		1,11	1.92	10.0	0.357	pCi/Sample	01/29/15 11:43	01/29/15 12:21	1.
Method: 0	GA-01∗R - Cesium-137 &	& Other Gan	nma Emitters Count Uncert.	s (GS) Total Uncert.						

			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	_ RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	0.894	W	4.13	4.13	80.0	7.57	pCi/Sample	01/29/15 11:46	01/29/15 17:11	
			Count	Total						
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(2\sigma+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None	2		and the second s	en en-manage -elementeden p _{erson} (1000	htt/ohit/e-dark.cube alatifed	pCi/Sample	01/29/15 11 46	01/29/15 17:11	1
Radionuclide										

Client Sample ID: WAA-03-AF-PS-20150121

Lab Sample ID: 160-10273-3 Date Collected: 01/21/15 10:53 Matrix: Filter Date Received: 01/26/15 11:30

Method: 9310 - G	ross Alpha / Beta (GFPC)								
		Count	Total						
		Uncert.	Uncert.						
Analyte	Result Qualifier	(2g+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	and the second s		, · ,	and the second second					
Gross Alpha	0.332	0.270	0,273	(0.0)	0.385	pCi/Sample	01/29/15 11:43	01/29/15 12 21	1

HUE 11 March 2015

TestAmerica St. Louis

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1/30/2015

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10273-2

Client Sample ID: WAA-03-AF-PS-20150121

Date Collected: 01/21/15 10:53 Date Received: 01/26/15 11:30 Lab Sample ID: 160-10273-3

Matrix: Filter

Method: GA-01-R -	Cesium-137 &	& Other Gan	nma Emitters	s (GS)						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(20+/-)	(2σ+/∗)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-1.27	Control of the second	4.91	4.91	(20.0)	8.92	pCi/Sample	01/29/15 11:46	01/29/15 18 14	1
			Count	Total	- September -					
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None	THE PERSONNEL AND ADDRESS OF	THE REAL PROPERTY AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AD	and hit manager on age out over the or			pCi/Sample	01/29/15 11:46	01/29/15 18 14	1
Radionuclide										

Client Sample ID: WAA-04-AF-PS-20150121

Date Collected: 01/21/15 11:08

Date Received: 01/26/15 11:30

Lab Sample ID: 160-10273-4

Matrix: Filter

Method: 9310 - Gro	ss Alpha / Be	ta (GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.401	and a	0.259	0.263	10.0	0.329	pCi/Sample	01/29/15 11:43	01/29/15 12:21	1
Gross Beta	18.1	- and differen	1.20	2.17	10,0	0.423	pCi/Sample	01/29/15 11:43	01/29/15 12:21	1
Method: GA-01-R -	Cesium-137 8	k Other Gan	nma Emitters	s (GS)						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ*/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-4,73	V(29.3	29.3	(20.0	13,4	pCi/Sample	01/29/15 11:46	01/29/15 18:15	1
			Count	Total						
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(2σ∗/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None	NOTICE STATE OF A MARKET SAME STATE OF THE S	***************************************	Sherring Advanced to the State of the State	A 1977-197	nicessorum saas viins sint- viitoriss	pCi/Sample	01/29/15 11:46	01/29/15 18:15	:

Client Sample ID: WAA-05-AF-PS-20150121

Result Qualifier

-1.09

(20+/-)

4.63

Date Collected: 01/21/15 10:31

Date Received: 01/26/15 11:30

Analyte

Cesium-137

	and the state of the first of the		
Lab	Sample	ID: 160-1	0273-5

Matrix: Filter

Method: 9310 - Gro	oss Alpha / Beta (GFPC)								
		Count	Total						
		Uncert.	Uncert.						
Analyte	Result Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0,171 W	0,229	0,230	(10.0)	0,384	pCi/Sample	01/29/15 11:43	01/29/15 12 21	1
Gross Beta	11.1	0.950	1.46	10.0	0.412	pCi/Sample	01/29/15 11:43	01/29/15 12:21	1
Method: GA-01-R -	- Cesium-137 & Other Gan	nma Emitters	(GS)						
		Count	Total						
		Uncert.	Uncert.						

 $(2\sigma + /-)$

HUE 11 Har 15

RL

MDC Unit

8.37 pCi/Sample

Prepared

01/29/15 11 46

TestAmerica St. Louis

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1/30/2015

Dil Fac

Analyzed

01/29/15 18.16

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10273-2

Lab Sample ID: 160-10273-5

Matrix: Filter

Client Sample ID: WAA-05-AF-PS-20150121

Date Collected: 01/21/15 10:31 Date Received: 01/26/15 11:30

**************************************				Count	Total						
	Other Detected			Uncert,	Uncert.						
	Radionuclides	Result	Qualifier	(20+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
,	Other Detected	None	-an-an-an-y aran-an-an-an-a-	Alifon with the man state of the second seco	Alles No de como consulta la laborado está distribuida de la consulta del consulta de la consulta de la consulta del consulta de la consulta del consulta de la consulta de la consulta de la consulta del consulta de la consulta del consulta de la consulta del consulta de la consulta de la consulta de la consulta del consulta del consulta de la consul	-могитель (заможнования включа	AMERICAN STREET, ST. MC 12 AND ASSESSMENT OR.	pCi/Sample	01/29/15 11:46	01/29/15 18:16	1
1	Radionuclide										

Client Sample ID: WAA-00-AF-FB-20150121

Date Collected: 01/21/15 00:00

Date Received: 01/26/15 11:30

Matrix: Filter

Method: 9310 - Gro	•	,	Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.0504	U	0.160	0.160	(10.0)	0.316	pCi/Sample	01/29/15 11:43	01/29/15 12:21	fator instrument of
Gross Beta	1.49	Land.	0.381	0.409	10.0	0.354	pCi/Sample	01/29/15 11:43	01/29/15 12 21	
			Count	Total						
Method: GA-01-R -										
		Qualifier	Uncert.	Uncert.	S. RI	MDC	1 Init	Propaged	Analyzad	Dil Es
Analyte	Result	Qualifier		Uncert. (2σ+/-)	RL 20.6	MDC 8.87	Unit	Prepared 01/29/15 11:46	Analyzed 01/29/15 19:17	Dil Fac
Analyte		**************************************	Uncert. (2σ+/-) 4.74	Uncert. (2σ+/-) 4.74	RL 20.9	MDC 8.87	Unit pCi/Sample	Prepared 01/29/15 11:46	Analyzed 01/29/15 19:17	Dil Fac
Analyte Cesium-137	Result	Zamolesse montenantini a	Uncert. (2σ+/-)	Uncert. (2σ+/-) 4.74 Total		Th. (1)	~		-	Dil Fac
Analyte Cesium-137 Other Detected Radionuclides	Result		Uncert. (2σ+/-) 4.74 Count	Uncert. (2σ+/-) 4.74		Th. (1)	pCi/Sample		-	Dil Fac

HVG 11 May 15

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

Method: 9310 - Gross Alpha / Beta (GFPC)

Lab Sample ID: MB 160-171021/1-A

Matrix: Filter

Analysis Batch: 171129

Client Sample ID: Method Blank

TestAmerica Job ID: 160-10273-2

Prep Type: Total/NA

Prep Batch: 171021

			Count	Total						
	MB	MB	Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.05930	U	0.190	0.190	10.0	0.366	pCi/Sample	01/29/15 11:43	01/29/15 12:20	1
Gross Beta	0.1990	U	0.223	0.224	10.0	0.364	pCi/Sample	01/29/15 11:43	01/29/15 12:20	1

Lab Sample ID: LCS 160-171021/2-A

Matrix: Filter

Analysis Batch: 171129

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 171021

	Spike	LCS	LCS	Uncert.				%Rec.
Analyte	Added	Result	Qual	(2σ+/-)	RL	MDC Unit	%Rec	Limits
Gross Alpha	5.37	5.710		1.04	10.0	0.338 pCi/Samp	106	75 _ 125

Lab Sample ID: LCSB 160-171021/3-A

Matrix: Filter

Analysis Batch: 171129

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 171021

Total LCSB LCSB Spike

Uncert. %Rec. MDC Unit Analyte Added (2σ+/-) RL %Rec Limits Result Qual Gross Beta 17.9 16.77 2.03 10.0 0.380 pCi/Samp 94 75 - 125

Lab Sample ID: 160-10273-1 DU

Matrix: Filter

Analysis Batch: 171129

Client Sample ID: WAA-01-AF-PS-20150121

Prep Type: Total/NA Prep Batch: 171021

Total

	Sample	Sample	DU	DU	Uncert.					RER
Analyte	Result	Qual	Result	Qual	(2σ+/-)	RL	MDC	Unit	RER	Limit
Gross Alpha	0.503		0.3599	U	0.268	10.0	0.366	pCi/Samp	 0.25	1
Gross Beta	18.1		17.50		2.10	10.0	0.357	pCi/Samr	0.15	1

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-171091/1-A Client Sample ID: Method Blank Matrix: Filter

Prep Type: Total/NA

İ	Analysis Batch: 171194									Prep Batch:	171091
	-			Count	Total					-	
		МВ	MB	Uncert.	Uncert.						
	Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Cesium-137	-3.700	U	28.0	28.0	20.0	15.8	pCi/Sample	01/29/15 11:46	01/29/15 17:08	1
				Count	Total						
	Other Detected	MB	MB	Uncert.	Uncert.						
	Radionuclides	Result	Qualifier	<i>(</i> 2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Other Detected	None						pCi/Sample	01/29/15 11:46	01/29/15 17:08	1
	Radionuclide										

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10273-2

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-171091/2-A Client Sample ID: Lab Control Sample

Matrix: Filter

Analysis Batch: 171193

Prep Type: Total/NA

Prep Batch: 171091

-				Total					
	Spike	LCS	LCS	Uncert.					%Rec.
Analyte	Added	Result	Qual	(2σ+/-)	RL	MDC	Unit	%Rec	Limits
Americium-241	32000	30690		3190		117	pCi/Samp	96	87 _ 116
Cesium-137	11100	10650		1120	20.0	65.0	pCi/Samr	96	87 - 120
Cobalt-60	11700	11420		1160		31.3	pCi/Samr	97	87 ₋ 115

Lab Sample ID: 160-10273-1 DU Client Sample ID: WAA-01-AF-PS-20150121

Matrix: Filter

Radionuclide

Prep Type: Total/NA

Analysis Batch	: 171194								Prep Batch: 1	71091
					Total					
	Sample	Sample	DU	DU	Uncert.					RER
Analyte	Result	Qual	Result	Qual	(2σ+/-)	RL	MDC	Unit	RER	Limit
Cesium-137	2.53	U	0.3525	U	7.72	20.0	15.9	pCi/Samr	0.18	1
					Total					
Other Detected	Sample	Sample	DU	DU	Uncert.					RER
Radionuclides	Result	Qual	Result	Qual	(2σ+/-)	RL	MDC	Unit	RER	Limit
Other Detected	None		None					pCi/Samr		

QC Association Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10273-2

Prep Batch: 171021

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10273-1	WAA-01-AF-PS-20150121	Total/NA	Filter	None	_
160-10273-1 DU	WAA-01-AF-PS-20150121	Total/NA	Filter	None	
160-10273-2	WAA-02-AF-PS-20150121	Total/NA	Filter	None	
160-10273-3	WAA-03-AF-PS-20150121	Total/NA	Filter	None	
160-10273-4	WAA-04-AF-PS-20150121	Total/NA	Filter	None	
160-10273-5	WAA-05-AF-PS-20150121	Total/NA	Filter	None	
160-10273-6	WAA-00-AF-FB-20150121	Total/NA	Filter	None	
LCS 160-171021/2-A	Lab Control Sample	Total/NA	Filter	None	
LCSB 160-171021/3-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-171021/1-A	Method Blank	Total/NA	Filter	None	

Prep Batch: 171091

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batcl
160-10273-1	WAA-01-AF-PS-20150121	Total/NA	Filter	None	
160-10273-1 DU	WAA-01-AF-PS-20150121	Total/NA	Filter	None	
160-10273-2	WAA-02-AF-PS-20150121	Total/NA	Filter	None	
160-10273-3	WAA-03-AF-PS-20150121	Total/NA	Filter	None	
160-10273-4	WAA-04-AF-PS-20150121	Total/NA	Filter	None	
160-10273-5	WAA-05-AF-PS-20150121	Total/NA	Filter	None	
160-10273-6	WAA-00-AF-FB-20150121	Total/NA	Filter	None	
LCS 160-171091/2-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-171091/1-A	Method Blank	Total/NA	Filter	None	

Tetra Tech, Inc. DATA VALIDATION REPORT LEVEL II

Site:	West Lake Landfill Site, Bridgeton, Missouri								
Laboratory:	TestAmerica Laboratories, Inc. (Earth City, Missouri)								
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)								
Review Date	March 12, 2015								
Sample Delivery Group (SDG):	J10333								
Sample Numbers:	WAA-01-AF-PS-20150128, WAA-02-AF-PS-20150128, WAA-03-AF-PS-20150128, WAA-04-AF-PS-20150128, WAA-05-AF-PS-20150128, and WAA-00-AF-FB-20150128								
Matrix / Number of Samples:	5 Air Samples and 1 Field Blank								
Methods Data Review" (9240.1-48) Packages from Subcontracted Laboratory Anderical Radiological Laboratory Anderical Specified in the applicable of the review was intended to identify apparent from the summary data parthat were found, and data qualificate limited to the available field and lab package.	problems and quality control (QC) deficiencies that were readily ckage. The following sections discuss any problems or deficiencies ions applied because of non-compliant QC. The data review was poratory QC information submitted with the project-specific data								
	alidation criteria outlined in the above-referenced documents were de to the data accorded with those documents.								
Hang N. Elli	12 March 2015								
Certified by Harry Ellis, Chemist	Date								

103I9025140058.000 1 SDG J10333

DATA VALIDATION QUALIFIERS

- U The analyte was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported sample quantitation limit, which is estimated.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

DATA ASSESSMENT

Sample delivery group (SDG) J10333 included five (5) environmental air (filter) samples and one (1) QC sample (a field blank). Samples were analyzed for total alpha-emitting radium by EPA SW-846 Method 9315 and for isotopic (alpha-emitting) thorium and radium by Department of Energy (DOE) Method A-01-R. The following summarizes the data validation that was performed.

RADIOANALYTICAL ANALYSES

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 6 months from sample collection to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Insufficient sample was available for MS/MSD analyses. Duplicate LCS analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blank yielded low activities for two (of three) thorium isotopes and the field blank yielded low activities for all of them, while neither yielded detectable activities for any of the three uranium isotopes. No qualifications were applied.

IV. Laboratory Control Sample (LCS)

All percent recoveries and relative percent differences from the duplicate LCS analyses were within established control limits.

V. Surrogates

These radioanalytical methods use a "carrier" or "tracer", whose recovery serves the same functions as surrogate recoveries. All carrier and tracer recoveries were within the laboratory's QC limits. No qualifications were applied.

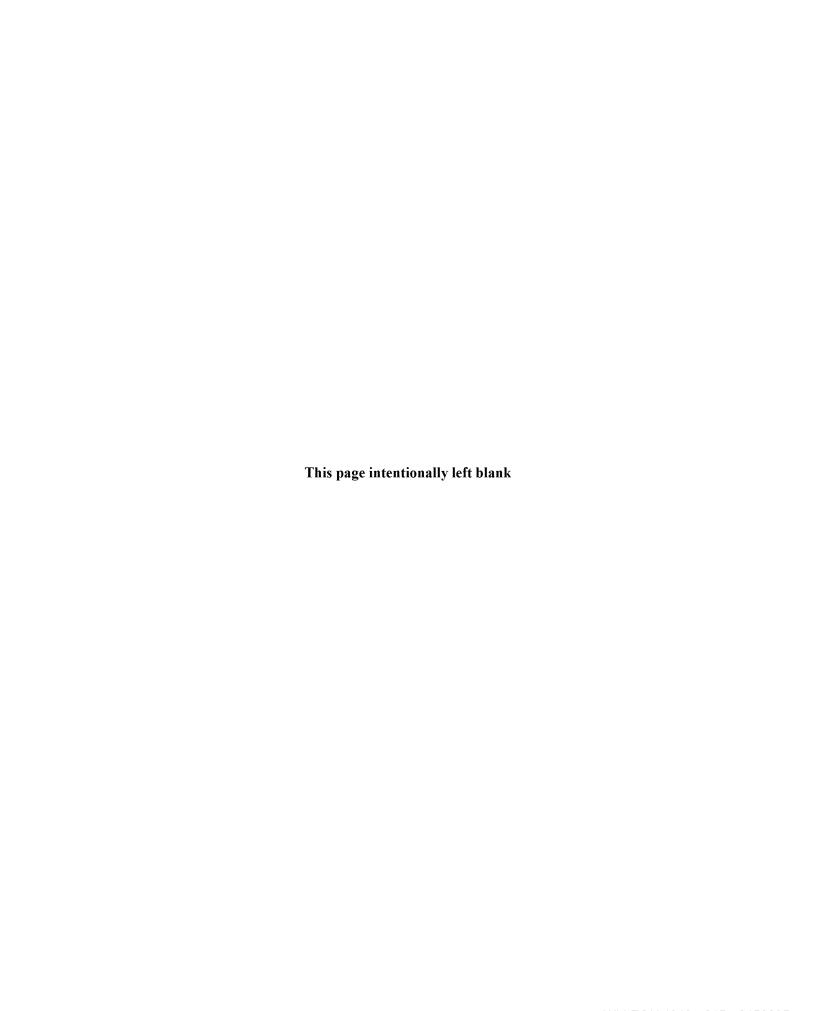
VI. Comments

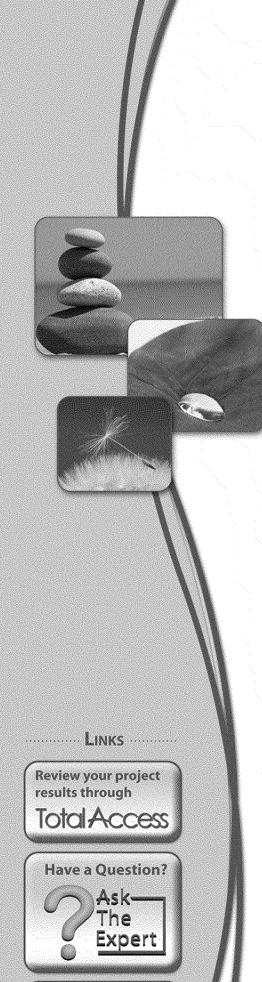
All detected results were less than their reporting limits ("RL"). These extrapolations should be qualified as estimated (flagged "J").

VII. Overall Assessment of Data

Overall data quality is acceptable, with few qualifications applied. All data are usable as qualified for their intended purposes.

103J9025140058,000 3 SDG J10333





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THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis 13715 Rider Trail North Earth City, MO 63045 Tel: (314)298-8566

TestAmerica Job ID: 160-10333-1

Client Project/Site: West Lake Landfill - Filters

For:

Tetra Tech EM Inc. 415 Oak Street Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

all

Authorized for release by: 2/27/2015 4:33:12 PM

Erika Gish, Project Manager II (314)298-8566

erika.gish@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

Job ID: 160-10333-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: West Lake Landfill - Filters

Report Number: 160-10333-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 2/2/2015 1:20 PM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 19.0° C.

TOTAL ALPHA RADIUM (GFPC)

Samples WAA-01-AF-PS-20150128 (160-10333-1), WAA-02-AF-PS-20150128 (160-10333-2), WAA-03-AF-PS-20150128 (160-10333-3), WAA-04-AF-PS-20150128 (160-10333-4), WAA-05-AF-PS-20150128 (160-10333-5) and WAA-00-AF-FB-20150128 (160-10333-6) were analyzed for Total Alpha Radium (GFPC) in accordance with SW- 846 Method 9315. The samples were prepared on 02/11/2015 and analyzed on 02/18/2015 and 02/19/2015.

Insufficient sample volume was available to perform a sample duplicate (DUP). The samples are filters that must be split between multiple analysis. A LCS/LCSD was used instead of a sample duplicate.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TestAmerica St. Louis

TestAmerica Job ID: 160-10333-1

Case Narrative

Client: Tetra Tech EM Inc.

Job ID: 160-10333-1 (Continued)

Project/Site: West Lake Landfill - Filters

Laboratory: TestAmerica St. Louis (Continued)

ISOTOPIC THORIUM (ALPHA SPECTROMETRY)

Samples WAA-01-AF-PS-20150128 (160-10333-1), WAA-02-AF-PS-20150128 (160-10333-2), WAA-03-AF-PS-20150128 (160-10333-3), WAA-04-AF-PS-20150128 (160-10333-4), WAA-05-AF-PS-20150128 (160-10333-5) and WAA-00-AF-FB-20150128 (160-10333-6) were analyzed for Isotopic Thorium (Alpha Spectrometry) in accordance with A-01-R. The samples were prepared on 02/09/2015 and analyzed on 02/18/2015 and 02/19/2015.

Insufficient sample volume was available to perform a sample duplicate (DUP). The samples are filters that must be split between multiple analysis. A LCS/LCSD was used instead of a sample duplicate.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM (ALPHA SPECTROMETRY)

Samples WAA-01-AF-PS-20150128 (160-10333-1), WAA-02-AF-PS-20150128 (160-10333-2), WAA-03-AF-PS-20150128 (160-10333-3), WAA-04-AF-PS-20150128 (160-10333-4), WAA-05-AF-PS-20150128 (160-10333-5) and WAA-00-AF-B-20150128 (160-10333-6) were analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with A-01-R. The samples were prepared on 02/09/2015 and analyzed on 02/18/2015.

Insufficient sample volume was available to perform a sample duplicate (DUP). The samples are filters that must be split between multiple analysis. A LCS/LCSD was used instead of a sample duplicate.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TestAmerica St. Louis

TestAmerica Job ID: 160-10333-1

TestAmerica St. Louis

Chain of Custody Record

13715 Rider Trail North

TestAmerica

Earth City, MO 63045 phone 314.298.8566 fax	Regulatory Program: Dw DNPDES RCRA Dther:													THE ECHOEST OF CHANGEMENTAL (CO)	1200.3							
					_NPDES			_													TestAmerica Laboratories,	inc.
Tetra Tech, Inc.		314-517-67	Dave Kinrot	<u>.n</u>							Cinrot				2-2-1					(°	COC No:	
415 Oak Street			798 urnaround	Time		Lab	Con	tact:	: Mi	ike F	ranks	;	<u> </u>	Carrier: NA							1 of1_ COCs	
Kansas City, MO 64106	CALEND			KING DAYS	<u> </u>	- 				1						1 1	-	Sampler:				
(816) 412-1786 Phone		if different from		20		l Iş	-					.	-			1			1 1		For Lab Use Only:	1
(816) 816-410-1748 FAX			weeks		-	I=E			١٤١	e	티					<i>i</i>			1 1		Walk-in Client: Lab Sampling:	
Project Name: West Lake Landfill Site	1 6						Bets	Spec	adii	orici :	(G M	1	1	1							Lab Salfiphing.	
Site: Bridgeton, MO	1 5	· · · · · · · · · · · · · · · · · · ·				e l	ala/	l S	la R	E	5 8				1 1					ŀ	Job / SDG No.:	
PO# 1105610	1 =		. day			Sample MS / MS	¥	Gamm	Ap	l go	g E		1							ŀ	300 / GDG 180	
			Sample			d Sa	9310 Gross Alpha/Beta	R G	9315 Total Alpha Radium	A-01-R Isotopic Thorium	A-01-R Isotopic Uranium * 9315 Radium-226 (GFPC)									t		-
	Sample	Sample	Type (C≔Comp,		#of	1916	2 0	GA-01-R (15.1	121	35	1 1	ı			1						
Sample Identification	Date	Time	G≖Grab)	Matrix	Cont.		83	8	8	₹;	₹ <u>%</u>	$\perp \perp$		\perp					Ш		Sample Specific Notes:	
WAA-01-AF-PS-20150128	1/28/15	11:12	Filter	Air	1	Ш	Х	Х	X	X :	x x							$oldsymbol{\mathbb{I}}$],	* 9315 Radium-226 (GFPC)	
WAA-02-AF-PS-20150128	1/28/15	10:12	Filter	Air	1	Ш	Х	Х	х	X Z	хх									,	contingent upon TAR results	
WAA-03-AF-PS-20150128	1/28/15	10:40	Filter	Air	1		х	х	х	x :	хx			\mathbf{L}						I	for all samples	
WAA-04-AF-PS-20150128	1/28/15	10:58	Filter	Air	1		х	Х	X	x :	хх						T			T		
WAA-05-AF-PS-20150128	1/28/15	10:25	Filter	Air	1		х	х	х	X	хх									T		
WAA-00-AF-FB-20150128	1/28/15	NA	Filter	Air	1	П	×	х	х	x	x x	\prod		\top	\prod			1	\sqcap	\top	And the state of t	
of			٠.			П		П	П	丌	T	$\overline{\Box}$	1	1	\prod	ΙŤ	\top	1	11	\top		
20						П	1	П	П	\sqcap	\top	\prod	T	\top		\sqcap			1	- 1 ())) 1		
						\prod	1	П	П	一	\top	\prod	\top	1	\Box	一	.					
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						П	1	П	П		\top	\Box		1			1	60-10	0333	Cha	in of Custody	
						\prod	1		П		1	\prod	\top	1	\prod	一	T	- ₇ ····	T - T	- Т	The same and the s	1
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=	NaOH; 6=	Other										Ħ										
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please L Comments Section if the lab is to dispose of the sample.	List any EP	A Waste C	odes for the	∍ sample	in the	s	amp	le D	ispo	sal (A fee	e may	/ be a	sses	sed	if saı	mple	s are	reta	ined	l longer than 1 month)	
☑Non-Hazard ☐Fammable ☐Skin Irritant	Poison	В	Unknov	wn			□R	Return	ı to Ci	lient			Dispos	sal by	Lab			Archi	ve for		Months	
Special Instructions/QC Requirements & Comments:																			-			
								•														
Custody Seals Intact: Yes No Custody Seal No.:									Coc	oler T	emp.	(°C): (Obs'd			Co	rr'd:_			Th	erm ID No.:	
Relinquished by Tury Brallean	Company: Date/Time:					表は	eseiv	1	<u> </u>	I	(1	10	Company:						[Date/Time: 22-K / 132a	
Relinquished by:		Tetra Tech 1/28/15 Company: Date/Time:				Received by:					Company:								Date/Time:			
고 Relinquished by:	<u> </u>		,	<u></u>															~~~~	_		
Relinquished by:	Company:			Date/Ti	me:	R	teceiv	/ed ii	n La	abora:	itory b	y: .			Cor	mpan	y:				Date/Time:	

Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc. Job Number: 160-10333-1

Login Number: 10333 List Source: TestAmerica St. Louis

List Number: 1 Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10333-1

Qualifiers

Rad

Qualifier Qualifier Description

U Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)

Dil Fac Dilution Factor

DL, RA, RE, IN Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample

DLC Decision level concentration

MDA Minimum detectable activity

EDL Estimated Detection Limit

MDC Minimum detectable concentration

MDL Method Detection Limit
ML Minimum Level (Dioxin)

NC Not Calculated

ND Not detected at the reporting limit (or MDL or EDL if shown)

PQL Practical Quantitation Limit

QC Quality Control
RER Relative error ratio

RL Reporting Limit or Requested Limit (Radiochemistry)

RPD Relative Percent Difference, a measure of the relative difference between two points

TEF Toxicity Equivalent Factor (Dioxin)
TEQ Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10333-1

Method	Method Description	Protocol	Laboratory
9315	Total Apha Radium (GFPC)	SW846	TAL SL
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10333-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-10333-1	WAA-01-AF-PS-20150128	Filter	01/28/15 11:12	02/02/15 13:20
160-10333-2	WAA-02-AF-PS-20150128	Filter	01/28/15 10:12	02/02/15 13:20
160-10333-3	WAA-03-AF-PS-20150128	Filter	01/28/15 10:40	02/02/15 13:20
160-10333-4	WAA-04-AF-PS-20150128	Filter	01/28/15 10:58	02/02/15 13:20
160-10333-5	WAA-05-AF-PS-20150128	Filter	01/28/15 10:25	02/02/15 13:20
160-10333-6	WAA-00-AF-FB-20150128	Filter	01/28/15 00:00	02/02/15 13:20

Client: Tetra Tech EM Inc.

Thorium-228

Thorium-230

Thorium-232

0.187

0.490

0.0751

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10333-1

Client Sample ID: WAA-01-AF-PS-20150128

Date Collected: 01/28/15 11:12 Date Received: 02/02/15 13:20 Lab Sample ID: 160-10333-1

Matrix: Filter

			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(20+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	D11 F
Total Alpha Radium	-0,00669	Ûχ	0.388	0.388	(1.00	0.741	pCi/Sample	02/11/15 14:07	02/18/15 16 40	Dil Fa
Carrier	%Yield	Qualifier	Limits							
Ba Carrier	104	I need the second-ordering against discussed	40 . 110					Prepared 02/11/15 14:07	Analyzed 02/18/15 16.40	Dil Fa
Method: A-01-R - Iso	tania Thavi	ima /Alasta a s							0210/15/10,40	
	opic mone	ını (Aipna i	opectrometry Count) Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(20+/-)	RL	MDC	Unit			
Thorium-228	0,187	W	0.179	0.179	(1.00)	0.275	pCi/Sample	Prepared	Analyzed	DII Fa
Thorium-230	0.325	-3	0.169	0.171	1.00	0.155		02/09/15 13:41	02/18/15 14 00	
Thorium-232	0.0383	-	0.0542	0.0543	(1.00	0.155	pCi/Sample pCi/Sample	02/09/15 13:41	02/18/15 14:00	
		Vį			()	0,0373	porsample	02/09/15 13:41	02/18/15 14:00	
Tracer	WORKS AND ADDRESS OF THE PARTY	Qualifier	Limits					Prepared	Analyzed	Dil Fa
Thorium-229	88.9		30 - 110					02/09/15 13:41	02/18/15 14:00	***************************************
Viethod: A-01-R - Isot	onic Hraniu	ım /Ainha S	2 m n n t w n w n t w n 1							
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	opic Grainu	iiii (Aipiia 3	pectrometry) Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(20+/-)	RL	***		_		
Jranium-233/234			0.0824	0.0826	1.00	MDC		Prepared	Analyzed	Dil Fac
Jranium-235/236		6-(0.0894	0.0895	1.00	0.111	pCi/Sample	02/09/15 13:41	02/18/15 20 10	1
Jranium-238	0.101	No.	0.0900	0,0904	1,00	0.139 0.0604	pCi/Sample	02/09/15 13:41	02/18/15 20 10	1
_		-mail		0,000,	****	0.0004	pCi/Sample	02/09/15 13:41	02/18/15 20:10	1
Tracer	Augustanian and an annual	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	85. <i>0</i>		30 - 110					02/09/15 13:41	02/18/15 20:10	
lient Sample ID: V	VAA-02-AI	F-PS-201	50128	manager of some that is not some	the state of the s	terropological des a seguino,	overed state State III sampling of the	I Ab Caus	- in 100 400 4	
ate Collected: 01/28/1								Lau Sam	ole ID: 160-1	
ate Received: 02/02/1									Matri	x: Filter
Viethod: 9315 - Total /	Anha Padiu	m (CEDC)			Programme Control					
· · · · · · · · · · · · · · · · · · ·	Third Italiai	m (01 r 0)	Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzad	Dil Ess
otal Alpha Radium	0.266	W	0.345	0.346	(1.00)		pCi/Sample	02/11/15 14:07	Analyzed 02/19/15 10:19	Dil Fac
	%Yield	Qualifier	Limits							
Carrier	AND THE RESIDENCE AND PROPERTY OF THE PARTY.	advatoreramente i julijaje antraj sprijestrativa (julije a	40 - 110					Prepared	Analyzed	Dil Fac
	105							02/11/15 14:07	02/19/15 10:19	1
la Carrier										
a Carrier		n (Alpha S	pectrometry):							
Ba Carrier		n (Alpha S	pectrometry): Count	Total						
Carrier Ba Carrier Method: A-01-R - Isoto			* -	Total Uncert.						

E 12 March 285

0.168

0.192

0.0751

TestAmerica St. Louis

02/18/15 14 00

02/18/15 14:00

02/18/15 14:00

02/09/15 13:41

02/09/15 13.41

02/09/15 13:41

Page 10 of 18

0.169

0,197

0.0753

(00)

1.00

1.00

0.253 pCi/Sample

0.0566 pCi/Sample

0.0563 pCi/Sample

2/27/2015

1

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10333-1

Client Sample ID: WAA-02-AF-PS-20150128

Date Collected: 01/28/15 10:12 Date Received: 02/02/15 13:20 Lab Sample ID: 160-10333-2

Matrix: Filter

Tracer	% Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	89.8	the desired line is required to the second control of the second c	30 - 110					02/09/15 13:41	02/18/15 14:00	1
Method: A-01-R - Iso	topic Uraniu	ım (Alpha S	pectrometry))						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0970	-	0.0867	0.0871	1.00	0.0582	pCi/Sample	02/09/15 13.41	02/18/15 20 10	1
Uranium-235/236	0.0141	W	0.0523	0.0523	(1.00)	0.133	pCi/Sample	02/09/15 13:41	02/18/15 20:10	1
Uranium-238	0.0968		0.0866	0.0869	1.00	0,0581	pCi/Sample	02/09/15 13:41	02/18/15 20:10	1
Tracer	% Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	92.2	0+0000000 NO 40000 N 10000 NO 1000000 NO	30 - 110					02/09/15 13:41	02/18/15 20:10	1

Client Sample ID: WAA-03-AF-PS-20150128

Date Collected: 01/28/15 10:40

Date Received: 02/02/15 13:20

Lab Sample ID: 160-10333-3 Matrix: Filter

Method: 9315 - Total	Apha Radiu	ım (GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(20+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	-0.0330	V	0,296	0,296	(1.0)	0.580	pCi/Sample	02/11/15 14:07	02/19/15 10:19	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	104		40 - 110					02/11/15 14:07	02/19/15 10:19	1
	Annie Theore	/ A looks C	· · · · · · · · · · · · · · · · · · ·							
Method: A-01-R - Iso	topic inorit	ım (Alpna S	pectrometry							
			Count	Total						

			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.164	W	0.149	0.150	6.00	0.222	pCi/Sample	02/09/15 13:41	02/18/15 14:00	1
Thorium-230	0.210	7	0.131	0.132	1.00	0.132	pCi/Sample	02/09/15 13:41	02/18/15 14:00	1
Thorium-232	0.0533	3	0.0615	0.0617	1.00	0.0533	pCi/Sample	02/09/15 13:41	02/18/15 14:00	İ
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	98.9		30 - 110					02/09/15 13:41	02/18/15 14:00	1

			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0,0210	V	0.0553	0.0553	1.00	0,119	pCi/Sample	02/09/15 13:41	02/18/15 20 10	1
Uranium-235/236	0.0355	W	0.0662	0.0663	1.00	0.124	pCl/Sample	02/09/15 13:41	02/18/15 20:10	1
Uranıum-238	0.0360	UU	0.0509	0.0510	1.00	0.0540	pCi/Sample	02/09/15 13:41	02/18/15 20:10	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	95.6	eranti aluen as cassendaden moominimeste ii	30 _ 110					02/09/15 13:41	02/18/15 20:10	1

HUE 12 Man 15

TestAmerica St. Louis

2/27/2015

Client: Tetra Tech EM Inc.

Tracer

Thorium-229

%Yield Qualifier

93.0

Limits

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10333-1

Client Sample ID: WAA-04-AF-PS-20150128

Date Collected: 01/28/15 10:58 Date Received: 02/02/15 13:20 Lab Sample ID: 160-10333-4

Matrix: Filter

Method: 9315 - Tota		. ,	Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(20+/-)	(2σ+/-)	DI	MDC	l lmia			
Total Alpha Radium	0.219	Arm & Coppe a series	0.393	0,393	RL (1.00)	MDC 0.677		Prepared 02/11/15 14 07	Analyzed	Dii Fa
A						0,0,,	pooumpic	02/11/13 14:0/	02/19/15 10:19	
Carrier	The second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second	Qualifier	Limits					Prepared	Analyzed	Dil Fa
Ba Carrier	104		40 - 110					02/11/15 14:07	02/19/15 10:19	PPP TVALEDON LIG.
Wethod: A-01-R - Is	otopic Thoriu	ım (Alpha S	pectrometry)						
			Count	Total						
			Uncert.	Uncert.						
\naiyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fa
horium-228	0.194	W.	0.162	0,163	(100	0.234	pCi/Sample	02/09/15 13:41	02/18/15 14:00	
Thorium-230	0.193		0.127	0.128	1.00	0.123	pCi/Sample	02/09/15 13:41	02/18/15 14:00	
Thorium-232	-0,0172	W.	0.0673	0.0673	(1.00)		pCi/Sample	02/09/15 13:41	02/18/15 14:00	
racer	%Yield	Qualifier	Limits							
Thorium-229	92,5	im-villar signific summanus sum magazings and	30 ₋ 110					Prepared	Analyzed	Dil Fa
	32.,3		30 . 110					02/09/15 13:41	02/18/15 14:00	
flethod: A-01-R - Iso	otopic Ur <mark>a</mark> niu	ım (Alpha S	-							
			Count	Total						
			Uncert.	Uncert.						
nalyte	* Ampropriation of committee and an annual statement	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fa
Jranium-233/234	0.138	u/	0.117	0.118	1.00	0.152	pCi/Sample	02/09/15 13:41	02/18/15 20:10	-0000 -0000
Jranium-235/236	0.0137	بان	0.0507	0.0508	1.00	0.129	pCi/Sample	02/09/15 13:41	02/18/15 20:10	
Jranium-238	-0.00783	ULI	0,0157	0.0157	1,00	0,104	pCi/Sample	02/09/15 13:41	02/18/15 20:10	1
Tracer	%Yield	Qualifier	Limits		***********			Prepared	Analyzed	Dil Fac
Jranium-232	90.0	Elifornia and a definition strate spring section with the control of the control	30 - 110					02/09/15 13:41	02/18/15 20:10	1
ient Sample ID:	WAA-05-Δ	F-PS-2014	50128	and the second s	where you are a start of the start of the same		Carrier and Carrier Carr			
ate Collected: 01/28			JOEALO					Lab Sam	ple ID: 160-1	0333-5
ite Received: 02/02/									Matri	ix: Filter
Mathed 024F Table	A and he are the statement of the statem		te transmission editoriorio grange e rigija a	- Metablika ana marana 12 mana	to det de carece e l'age tala-	and States Alban	- the sales as 17 has 12 minutes	And the Local Sections	the most of their extrator of the non-scalar and make a	electricity and the
Wethod: 9315 - Total	Apna Kadiu	m (GFPC)	Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	D.	MDO	11-14		4 04	
otal Alpha Radium	0.532	A STATE OF THE STA	0.376	0.379	RL \1.00\	MDC 0.552	pCi/Sample	Prepared 02/11/15 14:07	Analyzed 02/19/15 10:19	Dil Fac
• · · · · · · · · · · · · · · · · · · ·		*			-	-,	pos compic	WEF 1710 14.07	02/10/10 10,15	1
Carrier	15 15 th december or agreed when	Qualifier	Limits					Prepared	Analyzed	Dil Fac
la Carrier	102		40 - 110					02/11/15 14 07	02/19/15 10:19	1
lethod: A-01-R - Iso	topic Thoriu	m (Alpha S _l								
			Count	Total						
			Uncert.	Uncert.						
	- Published American American American Company	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
and the second s	- Published American American American Company	Qualifier	(2σ+/-) 0.155	(2σ+/∗) 0.156	RL (1,00)	Address of the same of the same of	Unit pCi/Sample	Prepared 02/09/15 13 41	Analyzed 02/19/15 20 52	Dil Fac
Analyte Thorium-228 Thorium-230	- Published American American American Company	mini translation make a mini	- the state of an analysis and the same	Attender several particular	The second secon	0.207		man ever- or acquired - Interpretation		~

(FU) = 12 Man 15
Page 12 of 18

TestAmerica St. Louis

2/27/2015

Dil Fac

Analyzed

02/19/15 20 52

Prepared

02/09/15 13 41

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10333-1

Lab Sample ID: 160-10333-5

Matrix: Filter

Client Sample ID: WAA-05-AF-PS-20150128

Date Collected: 01/28/15 10:25 Date Received: 02/02/15 13:20

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	-RC	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0372	V	0.0526	0.0527	1,00	0.0558	pCi/Sample	02/09/15 13:41	02/18/15 20:10	1
Uranium-235/236	-0.0193	W	0.0273	0.0273	1.00	0.152	pCi/Sample	02/09/15 13:41	02/18/15 20:10	1
Uranium-238	0.0479	Ü	0.0661	0.0662	1.00	0.103	pCi/Sample	02/09/15 13:41	02/18/15 20:10	1
Tracer	% Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	92.0	ARTHUR STREET, Co. Co. Co. Co. Co. Co. Co. Co. Co. Co.	30 - 110					02/09/15 13:41	02/18/15 20 10	1

Client Sample ID: WAA-00-AF-FB-20150128

Date Collected: 01/28/15 00:00 Date Received: 02/02/15 13:20 Lab Sample ID: 160-10333-6

Matrix: Filter

			Count	Total						
			Uncert.	Uncert.						
Analyte		Qualifier	(2σ+/-)	(2σ+/-)	RL		Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.0607	W	0,281	0,281	1.00	0.525	pCi/Sample	02/11/15 14:07	02/19/15 10:19	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	104	decisionistic value of the control o	40 - 110					02/11/15 14:07	02/19/15 10:19	1
Method: A-01-R - Iso	topic Thoriu	m (Alpha S	pectrometry)							
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(20+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.275		0.178	0,179	1.00	0.228	pCi/Sample	02/09/15 13:41	02/18/15 14:00	1
Thorium-230	0.703	3	0.232	0.240	1.00	0.104	pCi/Sample	02/09/15 13 41	02/18/15 14:00	1
Thorium-232	0.0751	3	0.0751	0.0753	1.00	0.0563	pCi/Sample	02/09/15 13:41	02/18/15 14:00	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	93.4	ESSENCE SERVICES PROPERTY OF CO	30 - 110					02/09/15 13:41	02/18/15 14 00	1
Method: A-01-R - Iso	topic Uraniu	ım (Alpha S	pectrometry)							
	•		Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	,RE	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0863	Y	0.0856	0.0860	1.00	0.104	pCi/Sample	02/09/15 13:41	02/18/15 20.10	1
Uranium-235/236	0.000	4	0.0195	0,0195	1.00	0.0703	pCi/Sample	02/09/15 13:41	02/18/15 20:10	4
Uranium-238	0.0485	W	0.0669	0.0671	1.00	0.104	pCi/Sample	02/09/15 13:41	02/18/15 20:10	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	91.3		30 . 110					02/09/15 13:41	02/18/15 20:10	1

HUE 12 Mar 15

TestAmerica St. Louis

2/27/2015

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

Method: 9315 - Total Apha Radium (GFPC)

Lab Sample ID: MB 160-173444/1-A Client Sample ID: Method Blank

Total

Count

Matrix: Filter

Prep Type: Total/NA Analysis Batch: 174681

Prep Batch: 173444

TestAmerica Job ID: 160-10333-1

MB MB Uncert. Uncert. Result Qualifier (2σ+/-) RL MDC Unit Analyte (2σ+/-) Prepared Analyzed Dil Fac 0.4832 Total Alpha Radium 0.438 0.441 1.00 0.688 pCi/Sample 02/11/15 14:07 02/18/15 16:25

> MВ MB

Carrier Qualifier Limits Dil Fac %Yield Prepared Analyzed Ba Carrier 40 - 110 98.5 02/11/15 14:07 02/18/15 16:25

Lab Sample ID: LCS 160-173444/2-A Client Sample ID: Lab Control Sample

Matrix: Filter Prep Type: Total/NA

Prep Batch: 173444

Analysis Batch: 174681 Total

45.0

48 42

Spike LCS LCS %Rec. Uncert. Added RL Analyte Result Qual (2σ+/-) MDC Unit %Rec Limits

Total Alpha Radium

LCS LCS

Carrier Limits %Yield Qualifier Ba Carrier 101 40 _ 110

Lab Sample ID: LCSD 160-173444/3-A Client Sample ID: Lab Control Sample Dup

Matrix: Filter

Prep Type: Total/NA Analysis Batch: 174681 Prep Batch: 173444

Total

5.05

1.00

0.925 pCi/Samp

108

65 _ 150

Spike LCSD LCSD Uncert. %Rec. RER Analyte Added Result Qual $(2\sigma + / -)$ RL MDC Unit %Rec Limits RER Limit 45.0 4.85 1.00 65 _ 150 Total Alpha 46.14 0.711 pCi/Samp 103 0.23

Radium

LCSD LCSD

Carrier %Yield Qualifier Limits Ba Carrier 99.1 40 - 110

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-172903/1-A Client Sample ID: Method Blank

Matrix: Filter

Prep Type: Total/NA Analysis Batch: 174545 Prep Batch: 172903

Count Total MB MB

Uncert. Uncert. Analyte Result Qualifier (2σ+/-) $(2\sigma + / -)$ RL MDC Unit Prepared Analyzed Dil Fac 0.5188 0.227 02/18/15 14:00 Thorium-228 0.223 1.00 0.211 pCi/Sample 02/09/15 13:41 Thorium-230 pCi/Sample 0.6105 0.224 0.230 1.00 02/09/15 13:41 02/18/15 14:00 0.130 1 Thorium-232 0.004114 U 0.0555 0.0555 1.00 0.146 pCi/Sample 02/09/15 13:41 02/18/15 14:00

MB MB

%Yield Dil Fac Tracer Qualifier Limits Prepared Analyzed Thorium-229 87.8 30 - 110 02/09/15 13:41 02/18/15 14:00

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10333-1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-172903/2-A

Analysis Batch: 174546

Matrix: Filter

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 172903

Total

LCS LCS Uncert. %Rec. Spike Result Qual Added RL MDC Unit %Rec Limits Analyte $(2\sigma + / -)$ Thorium-230 16.1 16.31 1.77 1.00 0.0580 pCi/Samp 102 81 _ 118

LCS LCS

%Yield Qualifier Limits Tracer 30 - 110 Thorium-229 88.7

Lab Sample ID: LCSD 160-172903/3-A

Matrix: Filter

Analysis Batch: 174547

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 172903

Total

LCSD LCSD %Rec. RER Spike Uncert. Added Analyte Result Qual (2σ+/-) RL MDC Unit %Rec Limits RER Limit Thorium-230 16.1 18 25 1.97 1.00 0.115 pCi/Samp 114 81 _ 118 0.52

LCSD LCSD

%Yield Qualifier Tracer Limits Thorium-229 82.3 30 - 110

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 160-172904/1-A

Matrix: Filter

Analysis Batch: 174534

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 172904

Count Total MB MB Uncert. Uncert. Analyte Result Qualifier (2σ+/-) $(2\sigma + / -)$ RL MDC Unit Prepared Analyzed Dil Fac U 02/09/15 13:41 02/18/15 20:10 Uranium-233/234 0.1150 0.110 0.110 1.00 0.148 pCi/Sample Uranium-235/236 0.02489 U 0.0498 0.0498 02/18/15 20:10 1.00 0.0747 pCi/Sample 02/09/15 13:41 1 Uranium-238 0.01497 U 0.0634 0.0634 1.00 0.147 pCi/Sample 02/09/15 13:41 02/18/15 20:10

Total

MB MB

Tracer %Yield Qualifier Limits Uranium-232 86.8 30 - 110

02/09/15 13:41 02/18/15 20:10

Analyzed

Prepared

Lab Sample ID: LCS 160-172904/2-A

Matrix: Filter

Analysis Batch: 174535

Client Sample ID: Lab Control Sample Prep Type: Total/NA

%Rec.

Dil Fac

Prep Batch: 172904

Spike LCS LCS Uncert. Analyte Added Result Qual (2σ+/-) RL MDC Unit %Rec

Limits 25.5 25 48 2 61 1 00 0.213 pCi/Samp 100 84 - 120 Uranium-233/23 Uranium-238 26.0 28.88 2.90 1.00 0.162 pCi/Samp 111 82 _ 122

LCS LCS

%Yield Tracer Qualifier Limits 80.6 30 - 110 Uranium-232

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10333-1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCSD 160-172904/3-A Client Sample ID: Lab Control Sample Dup

Matrix: Filter

Analysis Batch: 174536

Prep Type: Total/NA Prep Batch: 172904

				Total							
	Spike	LCSD	LCSD	Uncert.					%Rec.		RER
Analyte	Added	Result	Qual	(2σ+/-)	RL	MDC	Unit	%Rec	Limits	RER	Limit
Uranium-233/23	25.5	24.89		2.54	1.00	0.138	pCi/Samr	98	84 _ 120	0.11	1
4											
Uranium-238	26.0	26.55		2.68	1.00	0.0626	pCi/Samr	102	82 _ 122	0.42	1

 LCSD
 LCSD

 Tracer
 %Yield
 Qualifier
 Limits

 Uranium-232
 81.5
 30 - 110

QC Association Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10333-1

Rad

Prep Batch: 172903

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10333-1	WAA-01-AF-PS-20150128	Total/NA	Filter	ExtChrom	_
160-10333-2	WAA-02-AF-PS-20150128	Total/NA	Filter	ExtChrom	
160-10333-3	WAA-03-AF-PS-20150128	Total/NA	Filter	ExtChrom	
160-10333-4	WAA-04-AF-PS-20150128	Total/NA	Filter	ExtChrom	
160-10333-5	WAA-05-AF-PS-20150128	Total/NA	Filter	ExtChrom	
160-10333-6	WAA-00-AF-FB-20150128	Total/NA	Filter	ExtChrom	
LCS 160-172903/2-A	Lab Control Sample	Total/NA	Filter	ExtChrom	
LCSD 160-172903/3-A	Lab Control Sample Dup	Total/NA	Filter	ExtChrom	
MB 160-172903/1-A	Method Blank	Total/NA	Filter	ExtChrom	

Prep Batch: 172904

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10333-1	WAA-01-AF-PS-20150128	Total/NA	Filter	ExtChrom	
160-10333-2	WAA-02-AF-PS-20150128	Total/NA	Filter	ExtChrom	
160-10333-3	WAA-03-AF-PS-20150128	Total/NA	Filter	ExtChrom	
160-10333-4	WAA-04-AF-PS-20150128	Total/NA	Filter	ExtChrom	
160-10333-5	WAA-05-AF-PS-20150128	Total/NA	Filter	ExtChrom	
160-10333-6	WAA-00-AF-FB-20150128	Total/NA	Filter	ExtChrom	
LCS 160-172904/2-A	Lab Control Sample	Total/NA	Filter	ExtChrom	
LCSD 160-172904/3-A	Lab Control Sample Dup	Total/NA	Filter	ExtChrom	
MB 160-172904/1-A	Method Blank	Total/NA	Filter	ExtChrom	

Prep Batch: 173444

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10333-1	WAA-01-AF-PS-20150128	Total/NA	Filter	DPS-0	
160-10333-2	WAA-02-AF-PS-20150128	Total/NA	Filter	DPS-0	
160-10333-3	WAA-03-AF-PS-20150128	Total/NA	Filter	DPS-0	
160-10333-4	WAA-04-AF-PS-20150128	Total/NA	Filter	DPS-0	
160-10333-5	WAA-05-AF-PS-20150128	Total/NA	Filter	DPS-0	
160-10333-6	WAA-00-AF-FB-20150128	Total/NA	Filter	DPS-0	
LCS 160-173444/2-A	Lab Control Sample	Total/NA	Filter	DPS-0	
LCSD 160-173444/3-A	Lab Control Sample Dup	Total/NA	Filter	DPS-0	
MB 160-173444/1-A	Method Blank	Total/NA	Filter	DPS-0	

Tracer/Carrier Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10333-1

Method: 9315 - Total Apha Radium (GFPC)

Matrix: Filter Prep Type: Total/NA

			Percent Yield (Acceptance Limits)
		Ва	
Lab Sample ID	Client Sample ID	(40-110)	
160-10333-1	WAA-01-AF-PS-20150128	104	
160-10333-2	WAA-02-AF-PS-20150128	105	
160-10333-3	WAA-03-AF-PS-20150128	104	
160-10333-4	WAA-04-AF-PS-20150128	104	
160-10333-5	WAA-05-AF-PS-20150128	102	
160-10333-6	WAA-00-AF-FB-20150128	104	
LCS 160-173444/2-A	Lab Control Sample	101	
LCSD 160-173444/3-A	Lab Control Sample Dup	99.1	
MB 160-173444/1-A	Method Blank	98.5	
Tracer/Carrier Legend			

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Filter Prep Type: Total/NA

			Percent Yield (Acceptance Limits)
		Th-229	
Lab Sample ID	Client Sample ID	(30-110)	
160-10333-1	WAA-01-AF-PS-20150128	88.9	
160-10333-2	WAA-02-AF-PS-20150128	89.8	
160-10333-3	WAA-03-AF-PS-20150128	98.9	
160-10333-4	WAA-04-AF-PS-20150128	92.5	
160-10333-5	WAA-05-AF-PS-20150128	93.0	
160-10333-6	WAA-00-AF-FB-20150128	93.4	
LCS 160-172903/2-A	Lab Control Sample	88.7	
LCSD 160-172903/3-A	Lab Control Sample Dup	82.3	
MB 160-172903/1-A	Method Blank	87.8	
Tracer/Carrier Legend			
Th-229 = Thorium-229			

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Filter Prep Type: Total/NA

			Percent Yield (Acceptance Limits)
		U-232	
Lab Sample ID	Client Sample ID	(30-110)	
160-10333-1	WAA-01-AF-PS-20150128	85.0	
160-10333-2	WAA-02-AF-PS-20150128	92.2	
160-10333-3	WAA-03-AF-PS-20150128	95.6	
160-10333-4	WAA-04-AF-PS-20150128	90.0	
160-10333-5	WAA-05-AF-PS-20150128	92.0	
160-10333-6	WAA-00-AF-FB-20150128	91.3	
LCS 160-172904/2-A	Lab Control Sample	80.6	
LCSD 160-172904/3-A	Lab Control Sample Dup	81.5	
MB 160-172904/1-A	Method Blank	86.8	
Tracer/Carrier Legend			
U-232 = Uranium-232			

J-232 = Oranium-232

Tetra Tech, Inc. DATA VALIDATION REPORT LEVEL II

Site:	West Lake Landfill Site, Bridgeton, Missouri
Laboratory:	TestAmerica Laboratories, Inc. (Earth City, Missouri)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	March 12, 2015
Sample Delivery Group (SDG):	J10418
Sample Numbers:	WAA-01-AF-PS-20150204, WAA-02-AF-PS-20150204, WAA-03-AF-PS-20150204, WAA-04-AF-PS-20150204, WAA-05-AF-PS-20150204, and WAA-00-AF-FB-20150204
Matrix / Number of Samples:	5 Air Samples and 1 Field Blank
Methods Data Review" (9240.1-48) Packages from Subcontracted Laboratory Anderical Radiological Laboratory Anderical Specified in the applicable of the review was intended to identify apparent from the summary data parthat were found, and data qualificate limited to the available field and lab package.	r problems and quality control (QC) deficiencies that were readily ckage. The following sections discuss any problems or deficiencies ions applied because of non-compliant QC. The data review was boratory QC information submitted with the project-specific data
	alidation criteria outlined in the above-referenced documents were de to the data accorded with those documents.
Hang N. Elli	12 March 2015
Certified by Harry Ellis, Chemist	Date

103I9025140058.000 1 SDG J10418

DATA VALIDATION QUALIFIERS

- U The analyte was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported sample quantitation limit, which is estimated.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

DATA ASSESSMENT

Sample delivery group (SDG) J10418 included five (5) environmental air (filter) samples and one (1) QC samples (a field blank). Samples were analyzed for gross alpha and beta radiation by EPA SW-846 Method 9310 and for cesium-137 and other gamma-emitters by Department of Energy (DOE) Method Ga-01-R. They were also analyzed for total alpha-emitting radium by EPA SW-846 Method 9315 and for isotopic (alpha-emitting) thorium and radium by Department of Energy (DOE) Method A-01-R. The following summarizes the data validation that was performed.

RADIOANALYTICAL ANALYSES

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 6 months from sample collection to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. LCS and duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blanks yielded no detectable activities and the field blank a low beta activity plus low activities for two (of three) thorium isotopes and one (of three) uranium isotopes. The other field samples yielded more than 5 times the field blank beta activity and either no detectable thorium and uranium activities or activities similar to the field blank. No qualifications were applied.

IV. Laboratory Control Sample (LCS)

All percent recoveries from the LCS analyses were within established control limits. No qualifications were applied.

V. Surrogates

Some of these radioanalytical methods use a "carrier" or "tracer", whose recovery serves the same functions as surrogate recoveries. All carrier and tracer recoveries were within the laboratory's QC limits. No qualifications were applied.

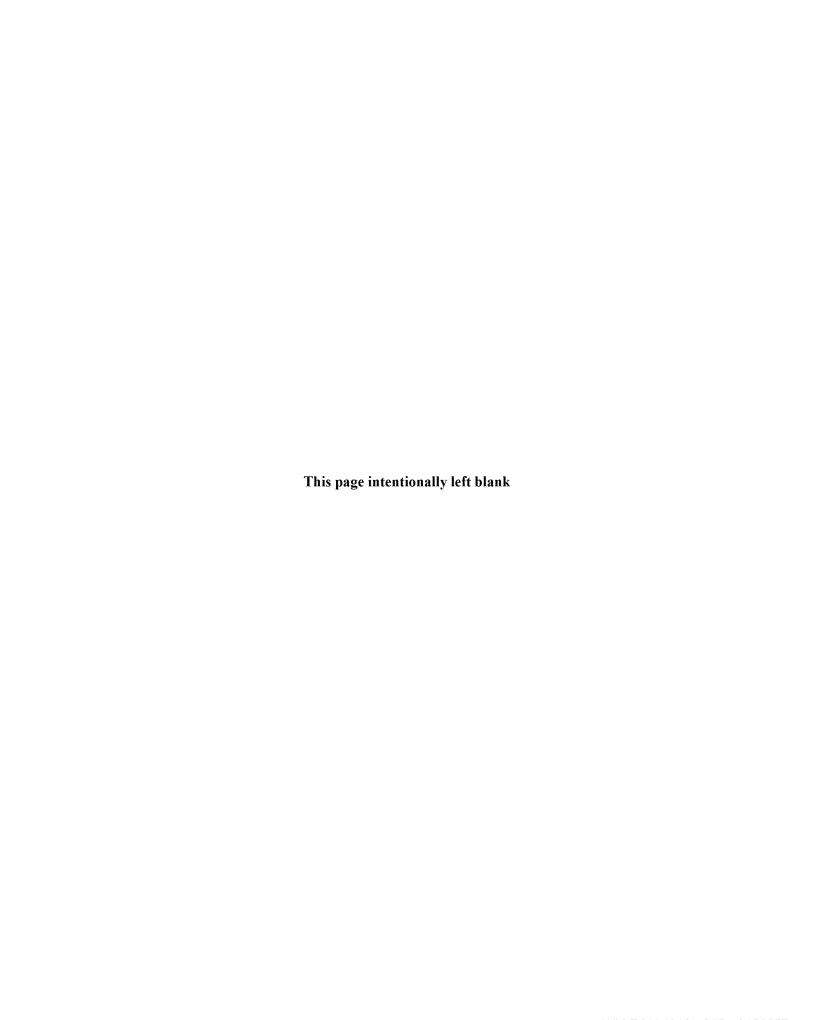
VI. Comments

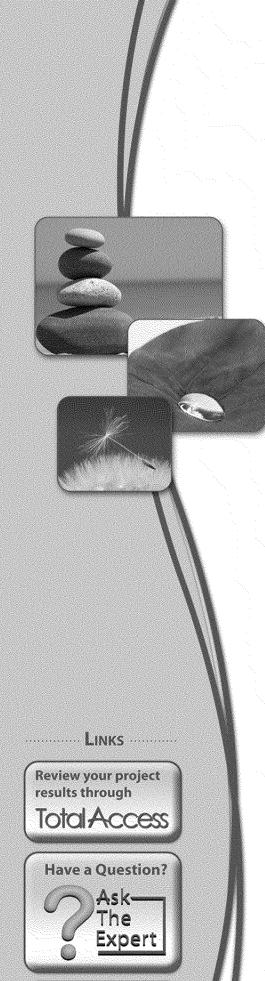
Some detected activities were less than their reporting limits ("RL"). These extrapolations should be qualified as estimated (flagged "J").

VII. Overall Assessment of Data

Overall data quality is acceptable, with no significant qualifications applied. All data are usable as qualified for their intended purposes.

103I9025140058.000 3 SDG J10418





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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis 13715 Rider Trail North Earth City, MO 63045 Tel: (314)298-8566

TestAmerica Job ID: 160-10418-1

Client Project/Site: West Lake Landfill - Filters

For:

Tetra Tech EM Inc. 415 Oak Street Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Authorized for release by: 3/10/2015 3:59:56 PM

Erika Gish, Project Manager II (314)298-8566 erika.gish@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10418-1

Job ID: 160-10418-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: West Lake Landfill - Filters

Report Number: 160-10418-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 2/9/2015 11:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 20.0° C.

GROSS ALPHA AND GROSS BETA RADIOACTIVITY

Samples WAA-01-AF-PS-20150204 (160-10418-1), WAA-02-AF-PS-20150204 (160-10418-2), WAA-03-AF-PS-20150204 (160-10418-3), WAA-04-AF-PS-20150204 (160-10418-4), WAA-05-AF-PS-20150204 (160-10418-5) and WAA-00-AF-FB-20150204 (160-10418-6) were analyzed for Gross Alpha and Gross Beta Radioactivity in accordance with SW846 9310. The samples were prepared and analyzed on 02/10/2015.

No additional analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

TOTAL ALPHA RADIUM (GFPC)

Samples WAA-01-AF-PS-20150204 (160-10418-1), WAA-02-AF-PS-20150204 (160-10418-2), WAA-03-AF-PS-20150204 (160-10418-3), WAA-04-AF-PS-20150204 (160-10418-4), WAA-05-AF-PS-20150204 (160-10418-5) and WAA-00-AF-FB-20150204 (160-10418-6) were

Case Narrative

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10418-1

Job ID: 160-10418-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

analyzed for Total Alpha Radium (GFPC) in accordance with SW- 846 Method 9315. The samples were prepared on 02/20/2015 and analyzed on 02/24/2015.

Insufficient sample volume was available to perform a sample duplicate (DUP). The samples are filters that must be split between multiple analysis. A LCS/LCSD was used instead of a sample duplicate.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC THORIUM (ALPHA SPECTROMETRY)

Samples WAA-01-AF-PS-20150204 (160-10418-1), WAA-02-AF-PS-20150204 (160-10418-2), WAA-03-AF-PS-20150204 (160-10418-3), WAA-04-AF-PS-20150204 (160-10418-4), WAA-05-AF-PS-20150204 (160-10418-5) and WAA-00-AF-B-20150204 (160-10418-6) were analyzed for Isotopic Thorium (Alpha Spectrometry) in accordance with A-01-R. The samples were prepared on 02/17/2015 and analyzed on 03/01/2015.

Insufficient sample volume was available to perform a sample duplicate (DUP). The samples are filters that must be split between multiple analysis. A LCS/LCSD was used instead of a sample duplicate.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM (ALPHA SPECTROMETRY)

Samples WAA-01-AF-PS-20150204 (160-10418-1), WAA-02-AF-PS-20150204 (160-10418-2), WAA-03-AF-PS-20150204 (160-10418-3), WAA-04-AF-PS-20150204 (160-10418-4), WAA-05-AF-PS-20150204 (160-10418-5) and WAA-00-AF-B-20150204 (160-10418-6) were analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with A-01-R. The samples were prepared on 02/17/2015 and analyzed on 03/01/2015.

Insufficient sample volume was available to perform a sample duplicate (DUP). The samples are filters that must be split between multiple analysis. A LCS/LCSD was used instead of a sample duplicate.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 & OTHER GAMMA EMITTERS (GS)

Samples WAA-01-AF-PS-20150204 (160-10418-1), WAA-02-AF-PS-20150204 (160-10418-2), WAA-03-AF-PS-20150204 (160-10418-3), WAA-04-AF-PS-20150204 (160-10418-4), WAA-05-AF-PS-20150204 (160-10418-5) and WAA-00-AF-FB-20150204 (160-10418-6) were analyzed for Radium-226 & Other Gamma Emitters (GS) in accordance with GA-01-R. The samples were prepared and analyzed on 02/10/2015.

No additional analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

TestAmerica St. Louis

Chain of Custody Record

13715 Rider Trail North

WLLFOIA4312 - 015 - 0156262

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Earth City, MO 63045 phone 314.298.8566 fax	Regui	latory Pro	gram: [Jow D	NPDES	r	RCRA												7	FootAmor	ion I al		
Client Contact			ave Kinrot		-	70-44					proth		Inat	0:20	15			_		TestAmer DC No:	ica Lai	orato	ries, inc.
Fetra Tech, Inc.					Site Contact: Dave Kinroth Lab Contact: Mike Franks						Date: 2-9-15 Carrier: NA				- 100	1 o	f 1	CC	·C-				
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Kansas City, MO 64106	CALENE			KING DAY	5							ı		1	-					r Lab Use	Only		
816) 412-1786 Phone	TAT	if different fro	m Below	_20	. 1	E					0	ĺ						1 1		alk-in Clier		1	
816) 816-410-1748 FAX		2	weeks			₹	<u>ro</u>		<u> </u>	<u> </u>	도					11			1	b Sampling		 	
Project Name: West Lake Landfill Site		1	week			Filtered Sample (Y/N	Gross Alpha/Beta	Gamm Spec	Radium	A-01-K isotopic I norlum A-01-R isotopic Uranium	* 9315 Radium-226 (GFPC)	-			1			11		• •	•	L	
Site: Bridgeton, MO		2	days			ag Sg	pha	E S	Alpha		125				-				Jol	b / SDG No	D.:.	***************************************	
PO# 1105610		1	day			am S	S A	Sam	₹ .	sotopic	1 5	į											**************************************
			Sample Type			3 2	Soc	유	Total,	S S	Ra Š				ı			11					
	Sample	Sample	(C≔Comp,		#of	를 들	9310 (GA-01-R	93157	A-01-R	315	1											
Sample Identification	Date	Time	G≖Grab)	Matrix	Cont	Ξď	8	Ö	8 3	₹₹	8									Samp	le Spec	ific Not	es:
WAA-01-AF-PS-20150204	2/4/15	11:19	Filter	Air	1		х	х	x 3	x x	X								* 9	315 Radiu	m-226	GFPC)
WAA-02-AF-PS-20150204	2/4/15	10:15	Filter	Air	1	\perp	x	х	x 2	x x	X								cor	ntingent up	on TAF	? result	S
WAA-03-AF-PS-20150204	2/4/15	10:47	Filter	Air	1	┸	х	х	x :	x x	X								for	all sample	es		
WAA-04-AF-PS-20150204	2/4/15	11:03	Filter	Air	. 1		х	х	x :	$x \mid x$	(x												
WAA-05-AF-PS-20150204	2/4/15	10:33	Filter	Air	1		х	х	x z	x x	X											60	
WAA-00-AF-FB-20150204	2/4/15	NA	Filter	Air	1		х	Х	x ;	x x	X					П						1041	
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Preservation Used: 1= lce, 2= HCl; 3= H2SO4; 4=HNO3; 5=	NaOH: 6≡	Other											2 5,42		(5) (4) (5)		145 534					-	
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please I Comments Section if the lab is to dispose of the sample.			odes for the	e sample	in the	s	amp	le D	ispos	sal (A fee	may	be as	sesse	difs	ampl	es ar	e reta	ined lo	onger than	1 m		
☑Non-Hazard ☐Flammable ☐Skin Irritant	Poison	В	Unkno	wn		1		etum	to Clie	ent			Disposa	by Lat	,		☐Arcl	nive for_		Months	; ,		Marketine Services and the services
Special Instructions/QC Requirements & Comments:	***************************************		•															_					
Custody Seals Infact: Yes No	Custody S	Seal No				·			Cool	er To	me /	°C): O	he'd.			orr'd:			Thom	m ID No.:		-	
Palinguished by:	Company			Date/Ti	we.	R	ecei	ed l	<u> </u>	VI 10	anp. (د). ن	u	10				***************************************		nte/Time:			
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Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc. Job Number: 160-10418-1

Login Number: 10418 List Source: TestAmerica St. Louis

List Number: 1 Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10418-1

Qualifiers

Rad

Qualifier **Qualifier Description**

Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.						
Elisted under the "D" column to designate that the result is reported on a dry weight basis							
%R	Percent Recovery						
CEL	Contains Free Liquid						

Contains Free Liquid CNF Contains no Free Liquid

DER Duplicate error ratio (normalized absolute difference)

Dil Fac Dilution Factor

 $\mathsf{DL}, \, \mathsf{RA}, \, \mathsf{RE}, \, \mathsf{IN}$ Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample

DLC Decision level concentration MDA Minimum detectable activity EDL **Estimated Detection Limit** MDC Minimum detectable concentration

MDL Method Detection Limit ML Minimum Level (Dioxin) Not Calculated NC

ND Not detected at the reporting limit (or MDL or EDL if shown)

PQL Practical Quantitation Limit

Quality Control QC RER Relative error ratio

RL Reporting Limit or Requested Limit (Radiochemistry)

Relative Percent Difference, a measure of the relative difference between two points RPD

TEF Toxicity Equivalent Factor (Dioxin) Toxicity Equivalent Quotient (Dioxin) TEQ

Method Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10418-1

Method	Method Description	Protocol	Laboratory
9310	Gross Alpha / Beta (GFPC)	SW846	TAL SL
9315	Total Apha Radium (GFPC)	SW846	TAL SL
4-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL SL
GA-01-R	Cesium-137 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10418-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-10418-1	WAA-01-AF-PS-20150204	Filter	02/04/15 11:19	02/09/15 11:10
160-10418-2	WAA-02-AF-PS-20150204	Filter	02/04/15 10:15	02/09/15 11:10
160-10418-3	WAA-03-AF-PS-20150204	Filter	02/04/15 10:47	02/09/15 11:10
160-10418-4	WAA-04-AF-PS-20150204	Filter	02/04/15 11:03	02/09/15 11:10
160-10418-5	WAA-05-AF-PS-20150204	Filter	02/04/15 10:33	02/09/15 11:10
160-10418-6	WAA-00-AF-FB-20150204	Filter	02/04/15 00:00	02/09/15 11:10

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10418-1

Client Sample ID: WAA-01-AF-PS-20150204

Date Collected: 02/04/15 11:19 Date Received: 02/09/15 11:10 Lab Sample ID: 160-10418-1

Matrix: Filter

Method: 9310 - Gros	s Alpha / Be	ta (GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fa
Gross Alpha	0.446	3	0.262	0,267	10.0	0.311	pCi/Sample	02/10/15 08 33		DII Fa
Gross Beta	12.8		1.00	1.63	10.0	0.383	•	02/10/15 08:33		
Method: 9315 - Total	Apha Radiu	ım (GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Manage and an arrange and a second	Qualifier	(20+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	D8 C-
Total Alpha Radium	0.167	W	0.365	0,366	(1.00)	0.645	pCi/Sample	02/20/15 09 26	02/24/15 17:48	Dil Fa
Carrier	%Yield	Qualifier	Limits					Dramanad		
Ba Carrier	103	Anne - Maringania and Anne apage	40 - 110					Prepared 02/20/15 09:26	Analyzed 02/24/15 17:48	Dil Fa
Method: A-01-R - Iso	topic Thoriu	m (Alpha S	pectrometry	1						
	•	, .,	Count	/ Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(20+/-)	(20+/-)	RL	MDC	Unit			
Thorium-228	0.355		0.200	0.202	1.00	0.250	pCi/Sample	Prepared	Analyzed	Dil Fac
Thorium-230	0.312	-3	0.159	0.161	1,00	0.135	pCi/Sample	02/17/15 08:50	03/01/15 21:32	1
Thorium-232	0.0636	W	0.0965	0.0966	(1.00)	0.167	pCi/Sample	02/17/15 08:50 02/17/15 08:50	03/01/15 21:32 03/01/15 21:32	1
Tracer	%Yield	Qualifier	Limits						00/01/10/21/32	1
Thorium-229	92.1	***************************************	30 - 110					Prepared	Analyzed	Dil Fac
			30 - 110					02/17/15 08:50	03/01/15 21:32	1
Method: A-01-R - Iso	opic Uraniu	m (Alpha S	pectrometry)						
			Count	, Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(20+/-)	RL	MDC	Unit	Dramanad		
Uranium-233/234	0,116	U /	0.122	0,123	1.00_		pCi/Sample	Prepared 02/17/15 08:50	Analyzed	Dil Fac
Uranium-235/236	0.0476	۵/	0.0674	0.0675	1,00		pCi/Sample		03/01/15 21:31	1
Uranium-238	0,0255	И	0.0734	0.0735	1.00		pCi/Sample	02/17/15 08:50 02/17/15 08:50	03/01/15 21:31	1
T					<u></u>	0.104	poroampie	02/17/15 08:50	03/01/15 21:31	1
Tracer Uranium-232	***************************************	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Oranium-232	90.5		30 - 110					02/17/15 08:50	03/01/15 21 31	1
Method: GA-01-R - Co	sium-137 &	Other Gam	ma Emitters	(GS)						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result ((2σ+/ _*)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	0.733	4	5.07	5.07	(20,0)		oCi/Sample	02/10/15 08 36	02/10/15 19:18	Dirac 1
National Property of the			Count	Total						
Other Detected			Uncert.	Uncert.						
Radionuclides Other Detected	Result (Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	None				- Contract of the Contract of	TO TO DEPART A THAT AND ADDRESS	Ci/Sample		·	I ac

HUE 12 March 2915

TestAmerica St. Louis

Page 10 of 22

3/10/2015

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10418-1

Client Sample ID: WAA-02-AF-PS-20150204

Date Collected: 02/04/15 10:15 Date Received: 02/09/15 11:10 Lab Sample ID: 160-10418-2

Matrix: Filter

Method: 9310 - Gros		(-11 -)	Count	Total						
			Uncert.							
Analyte	Result	Qualifier	(2σ+/-)	Uncert.	Di	MDO	11			
Gross Alpha	0.205		0.181	(2 0+/-)	RL		Unit	Prepared	Analyzed	Dil Fa
Gross Beta		•		0.182	(10.0)	0.250	pCi/Sample	02/10/15 08 33	02/10/15 12:08	
Gross pela	10.6		0.905	1.40	10.0	0.343	pCi/Sample	02/10/15 08:33	02/10/15 12:08	
Method: 9315 - Tota	l Apha Radiu	ım (GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte		Qualifier	(2σ+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dii Fa
Total Alpha Radium	0,626	Ų	0,463	0.467	(1.90	0.701	pCi/Sample	02/20/15 09:26	02/24/15 17:48	Sp. Schillister Spate (community of
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fa
Ba Carrier	103	14-1-180 NEW - Shirth Allehaman yang masa-sa e-	40 - 110					02/20/15 09:26	02/24/15 17:48	UII Fa
Method: A-01-R - Iso	itanic Thariu	ım /Alnha S	'nactromoter'							
	copic inone	un futhua c	Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	DI.	***	4.654			
Thorium-228	0.430	7	0.208	0,211	RL 1.00	MDC	de automa annual annual annual a	Prepared	Analyzed	Dil Fa
Thorium-230	0.397	Ī	0.181	0.184		0.232	pCi/Sample	02/17/15 08:50	03/01/15 21:32	
Thorium-232	0.103	3			1.00	0,150	pCi/Sample	02/17/15 08:50	03/01/15 21:32	
. 11011diii-232	0.103	_	0.0919	0.0923	1.00	0.102	pCi/Sample	02/17/15 08:50	03/01/15 21:32	
Tracer	% Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fa
Thorium-229	93,9		30 - 110					02/17/15 08:50	03/01/15 21:32	
Method: A-01-R - Iso	topic Uraniu	ım (Alpha S	pectrometry	+						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Jranium-233/234	0.0711	W	0.0891	0.0893	/1.00	0,140	pCi/Sample	02/17/15 08:50	03/01/15 21:31	
Jranium-235/236	0.00393	b /	0.0548	0.0548	1.00		pCi/Sample	02/17/15 08:50	03/01/15 21:31	
Jranium-238	0.0867	der.	0.0861	0.0864	1.00		pCi/Sample	02/17/15 08:50	03/01/15 21:31	
_					And the second second					
Tracer	***************************************	Qualifier	Limits					Prepared	Analyzed	Dil Fac
	91,3		30 - 110					02/17/15 08.50	03/01/15 21:31	TOTAL A MARKET ARREST SALARIAN
Jranium-232										
	esium-137 &	Other Gan	nma Emitters	(GS)						
<i>Jranium-232</i> Viethod: GA-01-R - C	esium-137 &	Other Gan	nma Emitters Count	(GS) Total						
	esium-137 &	Other Gan								
		Other Gan	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
//ethod: GA-01-R - C	Result		Count Uncert.	Total Uncert.	RL 20.0	and the same of the same	Unit pCi/Sample	Prepared 02/10/15 08:36	Analyzed 02/10/15 19:18	
Wethod: GA-01-R - C	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	The same of the sa	and the same of the same	Proposition and the contract of the contract o	AND A COMMERCIAL CONTRACTOR CONTR	The state of the s	
Method: GA-01-R - C unalyte Cesium-137	Result	Qualifier	Count Uncert. (2σ+/-) 6.09	Total Uncert. (2σ+/) 6.09	The same of the sa	and the same of the same	Proposition and the contract of the contract o	AND A COMMERCIAL CONTRACTOR CONTR	The state of the s	
Wethod: GA-01-R - C	Result -0,353	Qualifier	Count Uncert. (2σ+/-) 6.09 Count	Total Uncert. (2σ+/-) 6.09 Total	The same of the sa	and the same of the same	pCi/Sample	AND A COMMERCIAL CONTRACTOR CONTR	The state of the s	Dil Fac

HUE 12 May 15

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10418-1

Lab Sample ID: 160-10418-3

Matrix; Filter

	Africa April 1994 April 1994		on the state of th
Client	Sample	ID:	WAA-03-AF-PS-20150204

Date Collected: 02/04/15 10:47

Date Received: 02/09/	15 11:10	and a second control of the second second second second second second second second second second second second	or to announce to the same and the same and the	me. The territories with magnine to samp		· · · · · · · · · · · · · · · · · · ·				IA, I HEG
Method: 9310 - Gros	s Alpha / Be	ta (GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(20+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.368	3	0.241	0,244	10.0	0.296	pCi/Sample	02/10/15 08 33	02/10/15 12 08	
Gross Beta	13.1		1.01	1.65	10.0	0.348	pCi/Sample	02/10/15 08:33	02/10/15 12:08	1
Method: 9315 - Total	Apha Radiu	m (GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(20+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0,00620	W	0,311	0.311	(1,00)	0.602	pCi/Sample	02/20/15 09 26	02/24/15 17:48	handramus armidi olinin
Carrier	% Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	108		40 - 110					02/20/15 09:26	02/24/15 17:48	
Method: A-01-R - Iso	topic Thoriu	ım (Alpha S	pectrometry))						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.453	3	0.203	0,206	1.00	0.197	pCi/Sample	02/17/15 08:50	03/01/15 21:32	· ~~~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~
Thorium-230	0.371	7	0.166	0.169	1,00	0.0559	pCi/Sample	02/17/15 08:50	03/01/15 21:32	1
Thorium-232	0.0772	du.	0.0857	0.0859	(1.00)	0.122	pCi/Sample	02/17/15 08:50	03/01/15 21:32	
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	92.6		30 _ 110					02/17/15 08:50	03/01/15 21:32	•
Method: A-01-R - Iso	topic Uraniu	ım (Alpha S	pectrometry)						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	÷0.0178	W)	0.0696	0.0696	1.00	0.188	pCi/Sample	02/17/15 08:50	03/01/15 21:31	1
Uranium-235/236	0.0141	The same of the sa	0.0523	0.0523	1.00	0.133	pCi/Sample	02/17/15 08:50	03/01/15 21:31	1
Uranium-238	0.0968		0.0866	0.0870	1.00	0.0581	pCi/Sample	02/17/15 08:50	03/01/15 21 31	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	91.2	1	30 - 110					02/17/15 08:50	03/01/15 21:31	
Method: GA-01-R - C	esium-137 8	Other Gan	nma Emitters	(GS)						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-2.64	4	18.4	18.4	(20.0)	15.3	pCi/Sample	02/10/15 08:36	02/10/15 19 20	
			Count	Total						
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(20+/-)	(20+/-)	RL.	MDC	Unit	Prepared	Analyzed	Dil Fac
Be-7	112		51,3	52,5	*4*(*)	48 9	pCi/Sample	02/10/15 08:36	02/10/15 19.20	Aug was accommon and

HUG 12 Han 15

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10418-1

Client Sample ID: WAA-04-AF-PS-20150204

Date Collected: 02/04/15 11:03 Date Received: 02/09/15 11:10 Lab Sample ID: 160-10418-4

Matrix: Filter

	ss Alpha / Be		Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(20+/-)	(20+/-)	RL	MDC	Unit	Duna t		
Gross Alpha	0.269	W	0.219	0.221	(10.0)	0.304	pCi/Sample	Prepared	Analyzed	DilF
Gross Beta	12.1		0.977	1,56	10.0	0.391		02/10/15 08 33	02/10/15 12:08	
				1,00	10,0	0,391	pCi/Sample	02/10/15 08:33	02/10/15 12:08	
Method: 9315 - Tota	ıl Apha Radiı	ım (GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	the manney women to the state of the state o	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil F
Total Alpha Radium	0.341	W	0,339	0.341	(1.00)	0.536	pCi/Sample	02/20/15 09:26	02/24/15 17:48	DIS L
Carrier	% Violat	O			Camera					
Ba Carrier	% rieia 103	Qualifier	Limits					Prepared	Analyzed	Dil F
-a <i>-</i> a	103		40 - 110					02/20/15 09:26	02/24/15 17:48	W
Method: A-01-R - Iso	otonic Thoriu	ım (Alnha 9	Enactromota.							
	-1-610 1110116	···· (mipila c	Count) Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	***	11			
horium-228	0,229	W.	0.179	0.180	(1.00)	MDC		Prepared	Analyzed	Dil F
horium-230	0.300		0,150	0.152	- and Million		pCi/Sample	02/17/15 08:50	03/01/15 21:32	
Thorium-232		W	0.0665	0,0666	1.00		pCi/Sample	02/17/15 08:50	03/01/15 21:32	
			0.0000	0,0000	(.00)	0.125	pCi/Sample	02/17/15 08:50	03/01/15 21:32	
racer	%Yield	Qualifier	Limits					Prepared	Amplement	
Thorium-229	95.2	Managettiir Williams \ 1000/dated annual	30 - 110					02/17/15 08:50	Analyzed	Dil Fa
								0211110 00.30	03/01/15 21 32	
/lethod: A-01-R - Iso	topic Uraniu	m (Alpha S	pectrometry))						
			Count	Total						
			Uncert.	Uncert.						
Inalyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fa
Jranium-233/234	0.136	W	0.116	0.116	1.00	0.149	pCi/Sample	02/17/15 08:50	03/01/15 21:31	
Jranium-235/236	-0.00962	W.	0.0192	0.0193	1.00		pCi/Sample	02/17/15 08:50	03/01/15 21:31	
Iranium-238	0,114	W	0.100	0.101	1.00		pCi/Sample	02/17/15 08:50	03/01/15 21:31	
							•		00/01/10 21:01	
·maa.										
racer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fa
racer Iranium-232		Qualifier	Limits 30 - 110					Prepared 02/17/15 08:50	Analyzed 03/01/15 21:31	Dil Fa
Iranium-232	%Yield 89.7		30 - 110	(a-a)	**************************************			The second secon	The Secretary Control of the Control	
ranium-232	%Yield 89.7		30 - 110 nma Emitters		Carrent P.			The second secon	The Secretary Control of the Control	
Iranium-232	%Yield 89.7		30 - 110 nma Emitters Count	Total	**************************************			The second secon	The Secretary Control of the Control	
<i>lranium-232</i> llethod: GA-01-R - C	%Yield 89.7 esium-137 &	Other Gan	30 - 110 nma Emitters Count Uncert.	Total Uncert.				The second secon	The Secretary Control of the Control	
ranium-232 lethod: GA-01-R - C nalyte	%Yield 89.7 esium-137 & Result	Other Gan	30 - 110 nma Emitters Count Uncert. (20+/-)	Total Uncert. (2σ+/-)	RL	MDC (02/17/15 08 50 Prepared	The Secretary Control of the Control	MANAMENTAL AND AND AND AND AND AND AND AND AND AND
A COLOR A CALIFORNIA AND AND AND AND AND AND AND AND AND AN	%Yield 89.7 esium-137 &	Other Gan	30 - 110 nma Emitters Count Uncert. (20+/-) 4.97	Total Uncert.	RL 20.0	o e do contra do como con con con con con con con con con co	Jnit :Ci/Sample	02/17/15 08 50	03/01/15 21:31	
ranium-232 lethod: GA-01-R - C nalyte esium-137	%Yield 89.7 esium-137 & Result	Other Gan	30 - 110 nma Emitters Count Uncert. (20+/-)	Total Uncert. (2σ+/-)	The second second	o e do contra do como con con con con con con con con con co		02/17/15 08 50 Prepared	03/01/15 21:31 Analyzed	Dil Fa
ranium-232 lethod: GA-01-R - C nalyte esium-137 ther Detected	% Yield 89.7 esium-137 & Result -0.849	Other Gan Qualifier	30 - 110 nma Emitters Count Uncert. (20+/-) 4.97	Total Uncert. (2σ+/-) 4.97	The second second	o e do contra do como con con con con con con con con con co		02/17/15 08 50 Prepared	03/01/15 21:31 Analyzed	Dil Fa
Iranium-232 Iethod: GA-01-R - C nalyte esium-137 ther Detected adionuclides	% Yield 89.7 esium-137 & Result -0.849	Other Gan	30 - 110 nma Emitters Count Uncert. (20+/-) 4.97 Count	Total Uncert. (2σ+/-) 4.97	The second second	o e do contra do como con con con con con con con con con co	oCi/Sample	02/17/15 08:50 Prepared 02/10/15 08:36	03/01/15 21:31 Analyzed 02/10/15 19:20	Dil Fa
ranium-232 lethod: GA-01-R - C nalyte esium-137 ther Detected	% Yield 89.7 esium-137 & Result -0.849	Other Gan Qualifier	30 - 110 nma Emitters Count Uncert. (20+/-) 4.97 Count Uncert.	Total Uncert. (20+/-) 4.97 Total Uncert.	20,0	9.16 p	oCi/Sample	02/17/15 08 50 Prepared	03/01/15 21:31 Analyzed	Dil Fa

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10418-1

Client Sample ID: WAA-05-AF-PS-20150204 Lab Sample ID: 160-10418-5

Date Collected: 02/04/15 10:33 Matrix: Filter
Date Received: 02/09/15 11:10

Method: 9310 - Gross	s Alpha / Be	ta (GFPC)	_							
			Count	Total						
Analyte	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Decorate	Amakaad	Pa 14 pm
Gross Alpha	0.555	and attitues	0.287	0.294	10.0	0.328	pCi/Sample	Prepared 02/10/15 08:33	Analyzed 02/10/15 12:10	Dil Fac
Gross Beta	10.0		0.884	1.33	10.0	0.384	pCi/Sample	02/10/15 08:33		1
		um (CEDC)	0.001	1.00	.0,0	0.004	po: oumpre	02/10/10 00:53	02/10/15 12:10	1
Method: 9315 - Total	Aprila Kaulu	iiii (GFFC)	Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(20+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium		W	0.396	0.397	(1.00)	0.669	pCi/Sample	02/20/15 09:26	02/24/15 17:48	1
					Second State of the Second					
Carrier	% Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	105		40 - 110					02/20/15 09:26	02/24/15 17:48	1
Method: A-01-R - Iso	topic Thoriu	ım (Alpha S	pectrometry)						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2 0+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.412	7	0.190	0.193	1.00	0.183	pCi/Sample	02/17/15 08:50	03/01/15 21 32	1
Thorium-230	0.306	ブ	0.152	0.154	1.00	0.100	pCi/Sample	02/17/15 08:50	03/01/15 21:32	1
Thorium-232	0.0795	W	0.0827	0,0830	(1.00)	0,109	pCi/Sample	02/17/15 08:50	03/01/15 21:32	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	92.8		30 - 110					02/17/15 08:50	03/01/15 21:32	1
Method: A-01-R - Iso	topic Uraniu	ım (Alpha S	pectrometry)						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0442	ሲ/	0.0822	0.0823	1.00	0.153	pCi/Sample	02/17/15 08:50	03/01/15 21.31	1
Uranium-235/236	0.000	Ú/	0.0197	0.0197	1.00	0.0708	pCi/Sample	02/17/15 08:50	03/01/15 21:31	1
Uranium-238	0.0978	W	0.0954	0.0957	1.00	0.124	pCi/Sample	02/17/15 08:50	03/01/15 21:31	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	90,3	300 mg/s - ex-ex	30 - 110					02/17/15 08 50	03/01/15 21:31	1
Method: GA-01-R - C	esium-137 8	& Other Gar	nma Emitters	; (GS)						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(20+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dit Fac
Cesium-137	0.108	W	5.92	5.92	(20.0)	13.3	pCi/Sample	02/10/15 08 36	02/10/15 19.21	
		-	Count	Total	***************************************					
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(20+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
radionaciaes	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,									

HUE 12 Man 15

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10418-1

Client Sample ID: WAA-00-AF-FB-20150204

Date Collected: 02/04/15 00:00 Date Received: 02/09/15 11:10 Lab Sample ID: 160-10418-6

Matrix: Filter

ate Received: 02/09/1	15 11:10	d. M. Service anyonig subdivision from	And the second s		essential de la commencia de la compansión de la compansi	and the area of the second of the				
Method: 9310 - Gross	s Alpha / Be	ta (GFPC								
			Count	Total						
A makutu	D	O	Uncert.	Uncert.						
Analyte Gross Alpha	makes to a source at a sensemble to the company to a	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	California de la compansa del compansa de la compansa de la compansa del compansa de la compansa	Prepared	Analyzed	Dit Fa
•	0.118	4	0.202	0.202	(10.0)	0.356	pCi/Sample	02/10/15 08:33	02/10/15 12:10	
Gross Beta	1.50		0,397	0.424	10.0	0.407	pCi/Sample	02/10/15 08:33	02/10/15 12:10	
Method: 9315 - Total	Apha Radiu	m (GFPC								
			Count	Total						
			Uncert.	Uncert.						
Analyte	NA 1000 COOKS OFFICE ADDRESS AND ADDRESS A	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fa
Total Alpha Radium	0.186	W	0.281	0.282	(1.09	0.482	pCi/Sample	02/20/15 09:26	02/24/15 17:48	
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fa
Ba Carrier	106		40 - 110					02/20/15 09:26	02/24/15 17:48	
Method: A-01-R - Iso	topic Thoriu	ım (Alpha	Spectrometry)							
	·		Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fa
Thorium-228	0.314		0.188	0.190	1.00	0.236	pCi/Sample	02/17/15 08:50	03/01/15 21:32	***************************************
Thorium-230	0.356	7	0.168	0.170	1.00	0.122	pCi/Sample	02/17/15 08:50	03/01/15 21:32	
Thorium-232	0,0331	W.	0.0753	0.0753	(1.00)	0.149	pCi/Sample	02/17/15 08:50	03/01/15 21 32	•
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fa
Thorium-229	92,0	300000000000000000000000000000000000000	30 - 110					02/17/15 08:50	03/01/15 21:32	***************************************
Method: A-01-R - Iso	tonic Uraniu	ım (Alnha	Spectrometry)							
	copic oranic	···· (vibile	Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.144	-3	0.109	0.109	1.00	0.105	pCi/Sample	02/17/15 08 50	03/01/15 21 31	
Uranium-235/236	-0,00986	04	0.0197	0.0197	(1.00)	0.131	pCi/Sample	02/17/15 08:50	03/01/15 21:31	
Uranium-238	0.0380	W.	0.0537	0.0538	1.00	0.0569	pCi/Sample	02/17/15 08:50	03/01/15 21 31	
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fa
Uranium-232	88.6	***************************************	30 - 110					02/17/15 08:50	03/01/15 21:31	
Markhadi CA A4 19 C		04h	anno Frantska na	(OC)						
Method: GA-01-R - C	esiuiii-iə/ c	x Other G	Count	(GS) Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(20+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	1.84	manufacture for the former of the control	4,61	4.62	(20.0)		pCi/Sample	02/10/15 08 36	02/10/15 20 21	
			Count	Total						
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(20+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fa
Other Detected	Nane	***************************************			La alla commercia de la Carpopoli. Protestati	500000 = 10 00 NA NA NA 00 00 0000000	pCi/Sample	02/10/15 08 36	02/10/15 20 21	
6 Jr 6 J.										
Radionuclide			1 1 1				5			

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10418-1

Method: 9310 - Gross Alpha / Beta (GFPC)

Lab Sample ID: MB 160-173023/1-A Client Sample ID: Method Blank

Matrix: Filter

Prep Type: Total/NA Analysis Batch: 173049

Prep Batch: 173023

			Count	Total						
	MB	MB	Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.3496	U	0.262	0.265	10.0	0.353	pCi/Sample	02/10/15 08:33	02/10/15 12:08	1
Gross Beta	0.2898	U	0.245	0.247	10.0	0.378	pCi/Sample	02/10/15 08:33	02/10/15 12:08	1

Lab Sample ID: LCS 160-173023/2-A

Client Sample ID: Lab Control Sample

Matrix: Filter

Analysis Batch: 173049

Prep Type: Total/NA

Prep Batch: 173023

				Total				
	Spike	LCS	LCS	Uncert.				%Rec.
Analyte	Added	Result	Qual	(2σ+/-)	RL	MDC Unit	%Rec	Limits
Gross Alpha	5.37	5.158		0.972	10.0	0.329 pCi/Samp	96	75 _ 125

Lab Sample ID: LCSB 160-173023/3-A

Client Sample ID: Lab Control Sample

Matrix: Filter

Analysis Batch: 173049

Prep Type: Total/NA

Prep Batch: 173023

			Total				
Spike	LCSB	LCSB	Uncert.				%Rec.
Analyte Added	Result	Qual	(2σ+/-)	RL	MDC Unit	%Rec	Limits
Gross Beta 17.9	14.93		1.84	10.0	0.295 pCi/S	amr 84	75 - 125

Lab Sample ID: 160-10418-1 DU

Client Sample ID: WAA-01-AF-PS-20150204

Matrix: Filter

Analysis Batch: 173100

Prep Type: Total/NA

Prep Batch: 173023

					Total					
	Sample	Sample	DU	DU	Uncert.					RER
Analyte	Result	Qual	Result	Qual	(2σ+/-)	RL	MDC	Unit	RER	Limit
Gross Alpha	0.446		0.3396		0.246	10.0	0.328	pCi/Samr	0.21	1
Gross Beta	12.8		14.23		1.77	10.0	0.384	pCi/Samr	0.42	1

Method: 9315 - Total Apha Radium (GFPC)

96.8

Lab Sample ID: MB 160-174943/1-A Client Sample ID: Method Blank

Matrix: Filter

Ba Carrier

Analysis Batch: 177517

Prep Type: Total/NA Prep Batch: 174943

02/20/15 09:26 03/05/15 17:58

Analyolo Daton. 177017			Count	Total					i i op baton.	117070
	МВ	МВ	Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.09938	U	0.136	0.136	1.00	0.228	pCi/Sample	02/20/15 09:26	03/05/15 17:58	1
	МВ	МВ								
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac

40 - 110

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

Method: 9315 - Total Apha Radium (GFPC) (Continued)

Lab Sample ID: LCS 160-174943/2-A

Client Sample ID: Lab Control Sample

Matrix: Filter

Analysis Batch: 175571

Prep Type: Total/NA

Prep Batch: 174943

TestAmerica Job ID: 160-10418-1

LCS LCS Spike Uncert.

Added Result Qual (2σ+/-) RL MDC Unit %Rec Limits Analyte 45.0 42.32 1.00 65 _ 150 4.46 0.657 pCi/Samp Total Alpha

Radium

LCS LCS

Carrier %Yield Qualifier I imits Ba Carrier 98.8 40 - 110

Lab Sample ID: LCSD 160-174943/3-A Client Sample ID: Lab Control Sample Dup

Matrix: Filter

Analysis Batch: 175571

Prep Type: Total/NA

%Rec.

Prep Batch: 174943

Total

Total

Spike LCSD LCSD Uncert. %Rec. RER Analyte Added Result Qual $(2\sigma + / -)$ RL MDC Unit %Rec Limits RER Limit 45.0 46.63 4.87 1.00 0.743 pCi/Samp 104 65 - 150 0.46 Total Alpha

Radium

LCSD LCSD

Carrier %Yield Qualifier Limits 96.5 40 _ 110 Ba Carrier

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-174391/1-A Client Sample ID: Method Blank

Matrix: Filter

Thorium-230

Analysis Batch: 176462

Prep Type: Total/NA

Prep Batch: 174391

			Count	Total						
	МВ	MB	Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.2416	U	0.182	0.183	1.00	0.254	pCi/Sample	02/17/15 08:50	03/01/15 21:32	1
Thorium-230	0.04982	U	0.0961	0.0962	1.00	0.179	pCi/Sample	02/17/15 08:50	03/01/15 21:32	1
Thorium-232	0.04951	U	0.0830	0.0831	1.00	0.149	pCi/Sample	02/17/15 08:50	03/01/15 21:32	1

MB MB

%Yield Qualifier Limits Prepared Dil Fac Tracer Analyzed Thorium-229 91.1 30 _ 110 02/17/15 08:50 03/01/15 21:32

Lab Sample ID: LCS 160-174391/2-A

16.10

Client Sample ID: Lab Control Sample Matrix: Filter Prep Type: Total/NA

1.77

1.00

0.132 pCi/Samp

100

81 - 118

Prep Batch: 174391

Analysis Batch: 176463 Total

16.1

Spike LCS LCS Uncert. %Rec. Analyte RL Added Result Qual $(2\sigma + / -)$ MDC Unit %Rec Limits

LCS LCS

Tracer %Yield Qualifier Limits Thorium-229 87.5 30 - 110

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCSD 160-174391/3-A

Client Sample ID: Lab Control Sample Dup

TestAmerica Job ID: 160-10418-1

Matrix: Filter

Analysis Batch: 176464

Prep Type: Total/NA Prep Batch: 174391

Total

LCSD LCSD RER Spike Uncert. %Rec. MDC Unit Analyte Added Result Qual (2σ+/-) RL %Rec Limits RER Limit 1.00 Thorium-230 16.1 17.03 1.83 0.156 pCi/Samp 106 81 _ 118 0.26

LCSD LCSD

%Yield Qualifier Limits Tracer Thorium-229 88 2 30 - 110

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 160-174392/1-A

Client Sample ID: Method Blank

Matrix: Filter

Analysis Batch: 176471

Prep Type: Total/NA

Prep Batch: 174392

			Count	Total						
	MB	MB	Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	-0.01108	U	0.0923	0.0923	1.00	0.216	pCi/Sample	02/17/15 08:50	03/01/15 21:31	1
Uranium-235/236	0.01379	U	0.0512	0.0512	1.00	0.131	pCi/Sample	02/17/15 08:50	03/01/15 21:31	1
Uranium-238	0.05370	U	0.112	0.112	1.00	0.208	pCi/Sample	02/17/15 08:50	03/01/15 21:31	1

Limits

30 - 110

MB MB %Yield Qualifier

89.2

02/17/15 08:50 03/01/15 21:31

Analyzed

Prepared

Lab Sample ID: LCS 160-174392/2-A

Client Sample ID: Lab Control Sample

Matrix: Filter

Tracer

Uranium-232

Analysis Batch: 176472

Prep Type: Total/NA

Prep Batch: 174392

Dil Fac

Total Spike LCS LCS Uncert. %Rec. RL Added MDC Unit %Rec Limits Analyte Result Qual $(2\sigma + / -)$ 25.5 24.81 2.52 1.00 0.196 pCi/Samp 97 84 _ 120 Uranium-233/23 Uranium-238 26.0 2.60 25.75 1.00 0.174 pCi/Samp 99 82 - 122

LCS LCS

%Yield Qualifier Limits Tracer Uranium-232 82.3 30 - 110

Lab Sample ID: LCSD 160-174392/3-A Client Sample ID: Lab Control Sample Dup

Matrix: Filter

Analysis Batch: 176473

Prep Type: Total/NA

Prep Batch: 174392

Total LCSD LCSD Uncert. %Rec. RER Spike Analyte Added Result Qual $(2\sigma + / -)$ RL MDC Unit %Rec Limits RER Limit 25.5 24.94 2.55 1.00 pCi/Samp 98 0.02 Uranium-233/23 Uranium-238 26.0 26.66 2.69 1.00 0.202 pCi/Samp 102 82 _ 122 0.17

LCSD LCSD

Tracer %Yield Qualifier Limits Uranium-232 86.3 30 - 110

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10418-1

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (G	S	0	į
--	---	---	---

Lab Sample ID: MB 160-173024/1-A Client Sample ID: Method Blank

Matrix: Filter

Analysis Batch: 173091

Prep Type: Total/NA

Prep Batch: 173024

				ncert.						
Analyte	Result	Qualifier ([2σ+/-) (2	2σ+/-)	RL I	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium	137 0.0000	U	2.91	2.91	20.0	9.47	pCi/Sample	02/10/15 08:36	02/10/15 19:17	1

Total

Count

None

 MDC
 Unit
 Prepared
 Analyzed
 Dil Fac

 pCi/Sample
 02/10/15 08:36
 02/10/15 19:17
 1

Other Detected Radionuclide

Lab Sample ID: LCS 160-173024/2-A Client Sample ID: Lab Control Sample

RL

Matrix: Filter

Analysis Batch: 173090

Prep Type: Total/NA Prep Batch: 173024

Total Spike LCS LCS Uncert. %Rec. Analyte Added Result Qual $(2\sigma + / -)$ MDC Unit %Rec Limits 32000 30370 87 - 116 Americium-241 3160 119 pCi/Samp 95 Cesium-137 11100 10710 1120 20.0 65.3 pCi/Samp 97 87 _ 120 Cobalt-60 11700 11090 1120 54.7 pCi/Samp 87 - 115

Lab Sample ID: 160-10418-1 DU Client Sample ID: WAA-01-AF-PS-20150204

Matrix: Filter

Analysis Batch: 173091

Prep Type: Total/NA

Prep Batch: 173024

					Total					
	Sample	Sample	DU	DU	Uncert.					RER
Analyte	Result	Qual	Result	Qual	(2σ+/-)	RL	MDC	Unit	RER	Limit
Cesium-137	0.733	U	-1.587	U	5.19	20.0	9.19	pCi/Samr	0.23	1
					Total					
Other Detected	Sample	Sample	DU	DU	Uncert.					RER
Radionuclides	Result	Qual	Result	Qual	(2σ+/-)	RL	MDC	Unit	RER	Limit
Other Detected	None		None					pCi/Samr		

Radionuclide

QC Association Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10418-1

Prep	Batch:	173023
------	--------	--------

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10418-1	WAA-01-AF-PS-20150204	Total/NA	Filter	None	_
160-10418-1 DU	WAA-01-AF-PS-20150204	Total/NA	Filter	None	
160-10418-2	WAA-02-AF-PS-20150204	Total/NA	Filter	None	
160-10418-3	WAA-03-AF-PS-20150204	Total/NA	Filter	None	
160-10418-4	WAA-04-AF-PS-20150204	Total/NA	Filter	None	
160-10418-5	WAA-05-AF-PS-20150204	Total/NA	Filter	None	
160-10418-6	WAA-00-AF-FB-20150204	Total/NA	Filter	None	
LCS 160-173023/2-A	Lab Control Sample	Total/NA	Filter	None	
LCSB 160-173023/3-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-173023/1-A	Method Blank	Total/NA	Filter	None	

Prep Batch: 173024

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10418-1	WAA-01-AF-PS-20150204	Total/NA	Filter	None	_
160-10418-1 DU	WAA-01-AF-PS-20150204	Total/NA	Filter	None	
160-10418-2	WAA-02-AF-PS-20150204	Total/NA	Filter	None	
160-10418-3	WAA-03-AF-PS-20150204	Total/NA	Filter	None	
160-10418-4	WAA-04-AF-PS-20150204	Total/NA	Filter	None	
160-10418-5	WAA-05-AF-PS-20150204	Total/NA	Filter	None	
160-10418-6	WAA-00-AF-FB-20150204	Total/NA	Filter	None	
LCS 160-173024/2-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-173024/1-A	Method Blank	Total/NA	Filter	None	

Prep Batch: 174391

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batcl
160-10418-1	WAA-01-AF-PS-20150204	Total/NA	Filter	ExtChrom	
160-10418-2	WAA-02-AF-PS-20150204	Total/NA	Filter	ExtChrom	
160-10418-3	WAA-03-AF-PS-20150204	Total/NA	Filter	ExtChrom	
160-10418-4	WAA-04-AF-PS-20150204	Total/NA	Filter	ExtChrom	
160-10418-5	WAA-05-AF-PS-20150204	Total/NA	Filter	ExtChrom	
160-10418-6	WAA-00-AF-FB-20150204	Total/NA	Filter	ExtChrom	
LCS 160-174391/2-A	Lab Control Sample	Total/NA	Filter	ExtChrom	
LCSD 160-174391/3-A	Lab Control Sample Dup	Total/NA	Filter	ExtChrom	
MB 160-174391/1-A	Method Blank	Total/NA	Filter	ExtChrom	

Prep Batch: 174392

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batcl
160-10418-1	WAA-01-AF-PS-20150204	Total/NA	Filter	ExtChrom	-
160-10418-2	WAA-02-AF-PS-20150204	Total/NA	Filter	ExtChrom	
160-10418-3	WAA-03-AF-PS-20150204	Total/NA	Filter	ExtChrom	
160-10418-4	WAA-04-AF-PS-20150204	Total/NA	Filter	ExtChrom	
160-10418-5	WAA-05-AF-PS-20150204	Total/NA	Filter	ExtChrom	
160-10418-6	WAA-00-AF-FB-20150204	Total/NA	Filter	ExtChrom	
_CS 160-174392/2-A	Lab Control Sample	Total/NA	Filter	ExtChrom	
CSD 160-174392/3-A	Lab Control Sample Dup	Total/NA	Filter	ExtChrom	
MB 160-174392/1-A	Method Blank	Total/NA	Filter	ExtChrom	

Prep Batch: 174943

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10418-1	WAA-01-AF-PS-20150204	Total/NA	Filter	DPS-0	
160-10418-2	WAA-02-AF-PS-20150204	Total/NA	Filter	DPS-0	

QC Association Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10418-1

Rad (Continued)

Prep Batch: 174943 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10418-3	WAA-03-AF-PS-20150204	Total/NA	Filter	DPS-0	
160-10418-4	WAA-04-AF-PS-20150204	Total/NA	Filter	DPS-0	
160-10418-5	WAA-05-AF-PS-20150204	Total/NA	Filter	DPS-0	
160-10418-6	WAA-00-AF-FB-20150204	Total/NA	Filter	DPS-0	
LCS 160-174943/2-A	Lab Control Sample	Total/NA	Filter	DPS-0	
LCSD 160-174943/3-A	Lab Control Sample Dup	Total/NA	Filter	DPS-0	
MB 160-174943/1-A	Method Blank	Total/NA	Filter	DPS-0	

Tracer/Carrier Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10418-1

Method: 9315 - Total Apha Radium (GFPC)

Matrix: Filter Prep Type: Total/NA

			Percent Yield (Acceptance Limits)
		Ва	
Lab Sample ID	Client Sample ID	(40-110)	
160-10418-1	WAA-01-AF-PS-20150204	103	
160-10418-2	WAA-02-AF-PS-20150204	103	
160-10418-3	WAA-03-AF-PS-20150204	108	
160-10418-4	WAA-04-AF-PS-20150204	103	
160-10418-5	WAA-05-AF-PS-20150204	105	
160-10418-6	WAA-00-AF-FB-20150204	106	
LCS 160-174943/2-A	Lab Control Sample	98.8	
LCSD 160-174943/3-A	Lab Control Sample Dup	96.5	
MB 160-174943/1-A	Method Blank	96.8	
Tracer/Carrier Legend			

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Filter Prep Type: Total/NA

			Percent Yield (Acceptance Limits)
		Th-229	
Lab Sample ID	Client Sample ID	(30-110)	
160-10418-1	WAA-01-AF-PS-20150204	92.1	
160-10418-2	WAA-02-AF-PS-20150204	93.9	
160-10418-3	WAA-03-AF-PS-20150204	92.6	
160-10418-4	WAA-04-AF-PS-20150204	95.2	
160-10418-5	WAA-05-AF-PS-20150204	92.8	
160-10418-6	WAA-00-AF-FB-20150204	92.0	
_CS 160-174391/2-A	Lab Control Sample	87.5	
CSD 160-174391/3-A	Lab Control Sample Dup	88.2	
MB 160-174391/1-A	Method Blank	91.1	
Tracer/Carrier Legend			
Th-229 = Thorium-229			

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Filter Prep Type: Total/NA

			Percent Yield (Acceptance Limits)
		U-232	
ab Sample ID	Client Sample ID	(30-110)	
60-10418-1	WAA-01-AF-PS-20150204	90.5	
60-10418-2	WAA-02-AF-PS-20150204	91.3	
60-10418-3	WAA-03-AF-PS-20150204	91.2	
60-10418-4	WAA-04-AF-PS-20150204	89.7	
60-10418-5	WAA-05-AF-PS-20150204	90.3	
60-10418-6	WAA-00-AF-FB-20150204	88.6	
CS 160-174392/2-A	Lab Control Sample	82.3	
.CSD 160-174392/3-A	Lab Control Sample Dup	86.3	
ИВ 160-174392/1-A	Method Blank	89.2	
Tracer/Carrier Legend			

Tetra Tech, Inc. DATA VALIDATION REPORT LEVEL II

Site:	West Lake Landfill Site, Bridgeton, Missouri						
Laboratory:	TestAmerica Laboratories, Inc. (Earth City, Missouri)						
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)						
Review Date	March 11, 2015						
Sample Delivery Group (SDG):	J10545						
Sample Numbers:	WAA-01-AF-PS-20150211, WAA-02-AF-PS-20150211, WAA-03-AF-PS-20150211, WAA-04-AF-PS-20150211, WAA-05-AF-PS-20150211, and WAA-00-AF-FB-20150211						
Matrix / Number of Samples:	5 Air Samples and 1 Field Blank						
Methods Data Review" (9240.1-48) Packages from Subcontracted Laboratory Anderiteria specified in the applicable of the review was intended to identify apparent from the summary data parthat were found, and data qualification limited to the available field and lab package.	documents entitled "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review" (9240.1-48), June 2008. In addition, the Tetra Tech document "Review of Data Packages from Subcontracted Laboratories" (February 2002) and the EPA and others document "Multi-Agency Radiological Laboratory Analytical Protocols Manual" (July 2004) were used along with other criteria specified in the applicable methods. The review was intended to identify problems and quality control (QC) deficiencies that were readily apparent from the summary data package. The following sections discuss any problems or deficiencies that were found, and data qualifications applied because of non-compliant QC. The data review was limited to the available field and laboratory QC information submitted with the project-specific data package.						
	alidation criteria outlined in the above-referenced documents were de to the data accorded with those documents.						
Hang N. Ellis III							
Certified by Harry Ellis, Chemist	Date						

DATA VALIDATION QUALIFIERS

- U The analyte was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported sample quantitation limit, which is estimated.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

DATA ASSESSMENT

Sample delivery group (SDG) J10545 included five (5) environmental air (filter) samples and one (1) QC samples (a field blank). Samples were analyzed for gross alpha and beta radiation by EPA SW-846 Method 9310 and for cesium-137 and other gamma-emitters by Department of Energy (DOE) Method Ga-01-R. The following summarizes the data validation that was performed.

RADIOANALYTICAL ANALYSES

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 6 months from sample collection to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. LCS and duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blank yielded no detectable activities and the field blank a low beta activity. The other field samples yielded more than 10 times the field blank beta activity, so no qualifications were applied.

IV. Laboratory Control Sample (LCS)

All percent recoveries from the LCS analyses were within established control limits. No qualifications were applied.

V. Surrogates

Surrogates are not used in these radioanalytical methods.

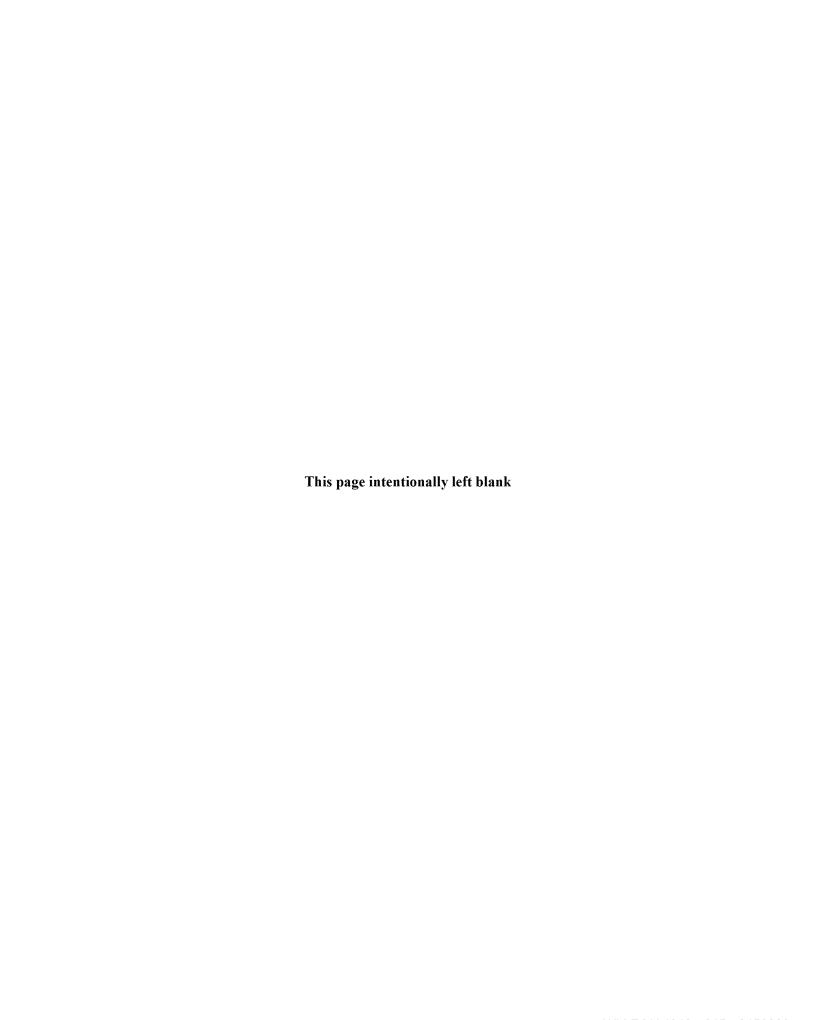
VI. Comments

Some detected activities were less than their reporting limits ("RL"). These extrapolations should be qualified as estimated (flagged "J").

VII. Overall Assessment of Data

Overall data quality is acceptable, with no significant qualifications applied. All data are usable as qualified for their intended purposes.

103J9025140058,000 3 SDG J10545



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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis 13715 Rider Trail North Earth City, MO 63045 Tel: (314)298-8566

TestAmerica Job ID: 160-10545-2

Client Project/Site: West Lake Landfill - Filters

For:

Tetra Tech EM Inc. 415 Oak Street Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Elizabeth M. Abercheur

Authorized for release by: 2/26/2015 3:58:01 PM Elizabeth Hoerchler, Project Mgmt. Assistant elizabeth.hoerchler@testamericainc.com

Designee for

Erika Gish, Project Manager II (314)298-8566 erika.gish@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

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Case Narrative

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

Job ID: 160-10545-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: West Lake Landfill - Filters

Report Number: 160-10545-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 02/19/2015; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 18.0° C.

GROSS ALPHA AND GROSS BETA RADIOACTIVITY

Samples WAA-01-AF-PS-20150211 (160-10545-1), WAA-02-AF-PS-20150211 (160-10545-2), WAA-03-AF-PS-20150211 (160-10545-3), WAA-04-AF-PS-20150211 (160-10545-4), WAA-05-AF-PS-20150211 (160-10545-5) and WAA-00-AF-FB-20150211 (160-10545-6) were analyzed for Gross Alpha and Gross Beta Radioactivity in accordance with SW846 9310. The samples were prepared on 02/23/2015 and analyzed on 02/24/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 & OTHER GAMMA EMITTERS (GS)

Samples WAA-01-AF-PS-20150211 (160-10545-1), WAA-02-AF-PS-20150211 (160-10545-2), WAA-03-AF-PS-20150211 (160-10545-3), WAA-04-AF-PS-20150211 (160-10545-4), WAA-05-AF-PS-20150211 (160-10545-6) and WAA-00-AF-FB-20150211 (160-10545-6) were

TestAmerica St. Louis

TestAmerica Job ID: 160-10545-2

Case Narrative

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10545-2

Job ID: 160-10545-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

analyzed for Radium-226 & Other Gamma Emitters (GS) in accordance with GA-01-R. The samples were prepared and analyzed on 02/23/2015.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TestAmerica St. Louis

13715 Rider Trail North

Chain of Custody Record

Tes	IAt	me	ric	a
		5.00		
THETEN	PAREST PAR COAL	MODERATE	17 54 mma-	

Earth City, MO 63045

WLLFOIA4312 - 015 - 0156288

phone 314.298.8566 fax	Regu	latory Pro	gram: []bw	NPDES	ı	RCR	A		Other:				TestAmerica Laboratories, Inc.
Client Contact	Project M	anager: D	ave Kinro	h		Site	Site Contact: Dave Kinroth Date:					h Date:	2-16-15	COC No:
Tetra Tech, Inc.	Tel/Fax:	314-517-67	98			-				Mike Franks Carri			er: NA	1 of 1 COCs
415 Oak Street		Analysis Tı	urnaround	Time	,	П	1		I	П				Sampler
Kansas City, MO 64106	CALENI	DAR DAYS	☑ WOR	KING DAY	S		_				1	1 1 1 1		For Lab Use Only:
(816) 412-1786 Phone	TAT	if different from	m Below	20	_				_		Q	1 1 1		Walk-in Client:
(816) 816-410-1748 FAX] [2.	weeks			Z	E E		l E	돌.	퇴병	1 1 1 1		Lab Sampling:
Project Name: West Lake Landfill Site Site: Bridgeton, MO			week			≥ 1	ž Ę	Spec	Ra	[훈]	Uranium 226 (GFF	1 1 1 1		
P O # 1105610			days			읦	Alpha/Be	Ē	pha	[e]	일같			Job / SDG No.:
. 0 % 1100010		1	^{day} Sample	7		Sample (Y	S S	ĺΰ	\ <u>\\</u>	훵.	Isotopic I Radium-2			
Sample Identification	Sample Date	Sample Time	Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	9310 Gross	GA-01-R	9315 Total Alpha Radium	A-01-R Isotopic Thorium	A-01-R isotopic Uranium * 9315 Radium-226 (GFPC)			Sample Specific Notes:
WAA-01-AF-PS-20150211	2/11/15	11:14	Filter	Air	1		Х	х	х	Х	хx			* 9315 Radium-226 (GFPC)
WAA-02-AF-PS-20150211	2/11/15	10:14	Filter	Air	1		Х	х	х	x.	x x			contingent upon TAR results
WAA-03-AF-PS-20150211	2/11/15	10:44	Filter	Air	1		×	x	x	x	хx			for all samples
WAA-04-AF-PS-20150211	2/11/15	10:58	Filter	Air	1		х	х	x	х	x x			
WAA-05-AF-PS-20150211	2/11/15	10:30	Filter	Air	1		Х	х	x	Х	хх			
WAA-00-AF-FB-20150211	2/11/15	NA.	Filter	Air	1		×	x	x	х	x x			
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						\vdash	╁		 -	$\vdash \vdash$	+	 	160-10545 Chain of Custoo	
			,			Ц				Щ				<u>-</u>
! .														
Preservation Used: 1= Ice, 2= HCI; 3= H2SO4; 4=HNO3; 5=	NaOH; 6=	Other						K.						
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please I	ist any EP	A Waste Co	des for the	sample	in the	5	Samp	le D)ispo	osal (A fee	may be asses	ssed if samples are retain	ned longer than 1 month)
Comments Section if the lab is to dispose of the sample.						_								
☑Non-Hazard ☐Flammable ☐Skin Irritant	Poison	В	∐Unkno	wn				Retur	n to C	lient		Disposal by	Lab Archive for	Months
Special Instructions/QC Requirements & Comments:														
Custody Seals Intact: Yes No	Custody S	eal No.:							Co	oler T	emp.	(°C): Obs'd:	Corr'd:	Therm ID No.:
Relinquished by Boulson	Company:	Tecr	\	Date/Ti 2/19/	me: 15 o9	30 F	Recei	∕ed	by:	2	****		Company:	Date/Time: 2/19/15 0930
Relinquished by:	Company:			Date/Ti			Recei	ved	by				Company:	Date/Time:
Relinquished by:	Company			Date/Ti	me.		Recei	/ed	in I s	hora	tory b	······································	Company:	Date/Time:
1				_ = =								j.	Company.	Date/ fille.

Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc. Job Number: 160-10545-2

Login Number: 10545 List Source: TestAmerica St. Louis

List Number: 1

Creator: Daniels, Brian J

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10545-2

Qualifiers

Rad

Qualifier Qualifier Description

U Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration

MDL Method Detection Limit
ML Minimum Level (Dioxin)
NC Not Calculated

1100 Galodiatou

ND Not detected at the reporting limit (or MDL or EDL if shown)

PQL Practical Quantitation Limit

QC Quality Control
RER Relative error ratio

RL Reporting Limit or Requested Limit (Radiochemistry)

RPD Relative Percent Difference, a measure of the relative difference between two points

TEF Toxicity Equivalent Factor (Dioxin)
TEQ Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10545-2

Method	Method Description	Protocol	Laboratory
9310	Gross Alpha / Beta (GFPC)	SW846	TAL SL
GA-01-R	Cesium-137 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10545-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-10545-1	WAA-01-AF-PS-20150211	Filter	02/11/15 11:14	02/19/15 09:30
160-10545-2	WAA-02-AF-PS-20150211	Filter	02/11/15 10:14	02/19/15 09:30
160-10545-3	WAA-03-AF-PS-20150211	Filter	02/11/15 10:44	02/19/15 09:30
160-10545-4	WAA-04-AF-PS-20150211	Filter	02/11/15 10:58	02/19/15 09:30
160-10545-5	WAA-05-AF-PS-20150211	Filter	02/11/15 10:30	02/19/15 09:30
160-10545-6	WAA-00-AF-FB-20150211	Filter	02/11/15 00:00	02/19/15 09:30

Client: Tetra Tech EM Inc.

Date Collected: 02/11/15 11:14

Date Received: 02/19/15 09:30

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10545-2

Lab Sample ID: 160-10545-1

Matrix: Filter

Client Sample ID: WAA-01-AF-PS-20150211

			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.830	C	0.340	0.353	10.0	0,322	pCi/Sample	02/23/15 15:25	02/24/15 07:15	1
Gross Beta	21.8		1.33	2.55	10.0	0.427	pCi/Sample	02/23/15 15:25	02/24/15 07:15	1

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dit Fac
Cesium-137	0.000	W(5.03	5.03	(20.0	9.47	pCi/Sample	02/23/15 15:31	02/23/15 18 28	1
			Count	Total						
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None		a diddididia ana ana ay ay ay ay ay ay ay ay ay ay ay ay ay		THE SECOND	Address of the Assessment of t	pCi/Sample	02/23/15 15:31	02/23/15 18:28	1
Radionuclide										

Client Sample ID: WAA-02-AF-PS-20150211

Date Collected: 02/11/15 10:14 Date Received: 02/19/15 09:30

Lab Sample ID: 160-10545-2

Matrix: Filter

Method: 9310 - Gross Alpha / Beta (GFPC)

			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.616	3	0.320	0.328	10.0	0.380	pCi/Sample	02/23/15 15:25	02/24/15 07:15	1
Gross Beta	17.4		1.16	2.09	10.0	0.418	pCi/Sample	02/23/15 15:25	02/24/15 07:15	1

Method: GA-01-R - C	esium-137 &	& Other Gan	nma Emitters	s (GS)						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	1,58	V	6.48	6.48	20.0	11.8	pCi/Sample	02/23/15 15:31	02/23/15 18 28	1
			Count	Total						
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(2σ+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None	Scillar landbroate mercerorus emply appealing y	overness-specialistics account to the contract of the contract	Activities of College of the College	1000 - April 100 -		pCi/Sample	02/23/15 15 31	02/23/15 18:28	1
Radionuclide										

Client Sample ID: WAA-03-AF-PS-20150211

Date Collected: 02/11/15 10:44 Date Received: 02/19/15 09:30

Lab Sample ID: 160-10545-3

Matrix: Filter

Method: 9310 - Gross Alpha / Beta (GEPC)

method: 3310 * G1035	withing i De	ia (GFFC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.535	23	0,303	0.309	10.0	0.375	pCi/Sample	02/23/15 15 25	02/24/15 07:16	1
Gross Beta	20.7		1.28	2.43	10.0	0.417	pCi/Sample	02/23/15 15 25	02/24/15 07:16	

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TestAmerica St. Louis

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Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10545-2

Client Sample ID: WAA-03-AF-PS-20150211

Date Collected: 02/11/15 10:44 Date Received: 02/19/15 09:30

Lab Sample ID: 160-10545-3

Matrix: Filter

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-1.71		5,75	5.75	20.0	10.2	pCi/Sample	02/23/15 15:31	02/23/15 19:37	1
			Count	Total						
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(20+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None		www.quillings-services constituted and rests.	necessary of the state and analysis of the state of the s	managan para da	o o la manana manana agga	pCi/Sample	02/23/15 15:31	02/23/15 19:37	1

Client Sample ID: WAA-04-AF-PS-20150211

Method: 9310 - Gross Alpha / Beta (GFPC)

Date Collected: 02/11/15 10:58

Date Received: 02/19/15 09:30

Lab Sample ID: 160-10545-4

Matrix: Filter

			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.597	3	0.316	0.323	10.0	0.374	pCi/Sample	02/23/15 15:25	02/24/15 07:16	1
Gross Beta	18.3		1.20	2.19	10.0	0.423	pCi/Sample	02/23/15 15:25	02/24/15 07:16	1
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	0,718	U	6,71	6.71	20.0	40.4	pCi/Sample	00/00/45 45 04	· · · · · · · · · · · · · · · · · · ·	
	0,7 10	Al.	0,71	0.71	20.0	12.4	porsample	02/23/15 15:31	02/23/15 19:36	1

Count Total Other Detected Uncert. Uncert. Radionuclides Result Qualifier $(2\sigma + /-)$ $(2\sigma + /-)$ RLMDC Unit Prepared Other Detected None pCi/Sample 02/23/15 15 31 02/23/15 19:36 Radionuclide

Client Sample ID: WAA-05-AF-PS-20150211

Date Collected: 02/11/15 10:30 Date Received: 02/19/15 09:30

Lab Sample ID: 160-10545-5 Matrix: Filter

Dil Fac

Analyzed

Method: 9310 - Gro	oss Alpha / Be	ta (GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.666	3	0.319	0.328	10.0	0.350	pCi/Sample	02/23/15 15 25	02/24/15 08:28	1
Gross Beta	16.1		1,14	1.97	10.0	0.440	pCi/Sample	02/23/15 15:25	02/24/15 08 28	1
Method: GA-01-R	Cesium-137 &	l Other Gan	nma Emitters	(GS)						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	9.92		4,14	4.27	20.0	3,18	pCi/Sample	02/23/15 15:31	02/23/15 19 36	1

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TestAmerica St. Louis

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2/26/2015

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10545-2

Client Sample ID: WAA-05-AF-PS-20150211

Date Collected: 02/11/15 10:30

Lab Sample ID: 160-10545-5

Matrix: Filter

Date Received: 02/19/15 09:30

			Count	Total						
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(20+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Be-7	103	A MARKA & MINISTER AND AND AND AND AND AND AND AND AND AND	45.6	46.8	otics about the second of the	40.9	pCi/Sample	02/23/15 15 31	02/23/15 19:36	7

Client Sample ID: WAA-00-AF-FB-20150211

Date Collected: 02/11/15 00:00

Other Detected

Radionuclide

Lab Sample ID: 160-10545-6

Analyzed

Matrix: Filter

Dil Fac

Date Received: 02/19/15 09:30 Method: 9310 - Gross Alpha / Beta (GFPC)

			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.0819	प	0.174	0.174	(10.0	0.323	pCi/Sample	02/23/15 15:25	02/24/15 08 28	1
Gross Beta	1.67	Second .	0.406	0.439	10.0	0,370	pCi/Sample	02/23/15 15:25	02/24/15 08:28	1

Method: GA-01-R - Cesium-137	&	Other Gamma	Emitters (GS)
------------------------------	---	-------------	---------------

None

			Count	Total	
			Uncert.	Uncert.	
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL
Cesium-137	-4.84	W	21.6	21.6	(20.0
			Count	Total	
Other Detected			Uncert.	Uncert.	
Radionuclides	Result	Qualifier	(20+/-)	(20+/-)	RL

13.9 pCi/Sample 02/23/15 15:31 02/23/15 19.39

Prepared

MDC Unit

MDC Unit Prepared Analyzed Dil Fac pCi/Sample 02/23/15 15:31 02/23/15 19:39

HU6 11 Mar 15

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

Method: 9310 - Gross Alpha / Beta (GFPC)

Lab Sample ID: MB 160-175372/1-A Client Sample ID: Method Blank

Matrix: Filter

Prep Type: Total/NA Analysis Batch: 175568

Prep Batch: 175372

			Count	Total						
	MB	MB	Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.07847	U	0.189	0.189	10.0	0.356	pCi/Sample	02/23/15 15:25	02/24/15 07:14	1
Gross Beta	0.1418	U	0.255	0.255	10.0	0.439	pCi/Sample	02/23/15 15:25	02/24/15 07:14	1

Lab Sample ID: LCS 160-175372/2-A

Client Sample ID: Lab Control Sample

Matrix: Filter

Analysis Batch: 175568

Prep Type: Total/NA Prep Batch: 175372

TestAmerica Job ID: 160-10545-2

				Total					
	Spike	LCS	LCS	Uncert.					%Rec.
Analyte	Added	Result	Quai	(2σ+/-)	RL	MDC	Unit	%Rec	Limits
Gross Alpha	5.37	5.097		0.971	10.0	0.350	pCi/Samr	95	75 _ 125

Lab Sample ID: LCSB 160-175372/3-A

Client Sample ID: Lab Control Sample

Matrix: Filter

Analysis Batch: 175568

Prep Type: Total/NA Prep Batch: 175372

Total

LCSB LCSB Spike Uncert. %Rec. MDC Unit Analyte Added RL %Rec Limits Result Qual $(2\sigma + / -)$ Gross Beta 17.8 18.24 2.18 10.0 0.370 pCi/Samp 102 75 - 125

Lab Sample ID: 160-10545-1 DU

Client Sample ID: WAA-01-AF-PS-20150211

Matrix: Filter

Analysis Batch: 175568

Prep Type: Total/NA

Prep Batch: 175372

					Total					
	Sample	Sample	DU	DU	Uncert.					RER
Analyte	Result	Qual	Result	Qual	(2σ+/-)	RL	MDC	Unit	RER	Limit
Gross Alpha	0.830		0.4884		0.295	10.0	0.356	pCi/Samr	0.53	1
Gross Beta	21.8		21.20		2.48	10.0	0.439	pCi/Samr	0.12	1

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-175374/1-A Client Sample ID: Method Blank

Matrix: Filter

Prep Type: Total/NA

Analysis Batch: 175292									Prep Batch:	175374
			Count	Total						
	МВ	MB	Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-1.549	U	5.31	5.31	20.0	9.41	pCi/Sample	02/23/15 15:31	02/23/15 18:28	1
			Count	Total						
Other Detected	MB	MB	Uncert.	Uncert.						
Radionuclides	Result	Qualifier	<i>(</i> 2σ+/- <i>)</i>	<i>(</i> 2σ+/- <i>)</i>	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/Sample	02/23/15 15:31	02/23/15 18:28	1
Radionuclide										

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10545-2

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-175374/2-A Client Sample ID: Lab Control Sample

Matrix: Filter

Prep Type: Total/NA Analysis Batch: 175294

Prep Batch: 175374

				iotai						
	Spike	LCS	LCS	Uncert.					%Rec.	
Analyte	Added	Result	Qual	(2σ+/-)	RL	MDC	Unit	%Rec	Limits	
Americium-241	32000	31970		3320		104	pCi/Samr	100	87 ₋ 116	
Cesium-137	11100	11060		1160	20.0	61.7	pCi/Samr	100	87 _ 120	
Cobalt-60	11600	11540		1170		38.2	pCi/Samr	99	87 ₋ 115	

Lab Sample ID: 160-10545-1 DU Client Sample ID: WAA-01-AF-PS-20150211

Matrix: Filter

Prep Type: Total/NA Analysis Ratch: 175292

Prep Batch: 175374

Analysis Datch	1. 1/5292								Prep Daton: 1	10014
					Total					
	Sample	Sample	DU	DU	Uncert.					RER
Analyte	Result	Qual	Result	Qual	(2σ+/-)	RL	MDC	Unit	RER	Limit
Cesium-137	0.000	U	-2.100	U	5.60	20.0	9.78	pCi/Samr	0.20	1
					Total					
Other Detected	Sample	Sample	DU	DU	Uncert.					RER
Radionuclides	Result	Qual	Result	Qual	(2σ+/-)	RL	MDC	Unit	RER	Limit
Other Detected	None		None					pCi/Samr		
Radionuclide										

QC Association Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

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Prep Batch: 175372

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10545-1	WAA-01-AF-PS-20150211	Total/NA	Filter	None	
160-10545-1 DU	WAA-01-AF-PS-20150211	Total/NA	Filter	None	
160-10545-2	WAA-02-AF-PS-20150211	Total/NA	Filter	None	
160-10545-3	WAA-03-AF-PS-20150211	Total/NA	Filter	None	
160-10545-4	WAA-04-AF-PS-20150211	Total/NA	Filter	None	
160-10545-5	WAA-05-AF-PS-20150211	Total/NA	Filter	None	
160-10545-6	WAA-00-AF-FB-20150211	Total/NA	Filter	None	
LCS 160-175372/2-A	Lab Control Sample	Total/NA	Filter	None	
LCSB 160-175372/3-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-175372/1-A	Method Blank	Total/NA	Filter	None	

Prep Batch: 175374

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batcl
160-10545-1	WAA-01-AF-PS-20150211	Total/NA	Filter	None	
160-10545-1 DU	WAA-01-AF-PS-20150211	Total/NA	Filter	None	
160-10545-2	WAA-02-AF-PS-20150211	Total/NA	Filter	None	
160-10545-3	WAA-03-AF-PS-20150211	Total/NA	Filter	None	
160-10545-4	WAA-04-AF-PS-20150211	Total/NA	Filter	None	
160-10545-5	WAA-05-AF-PS-20150211	Total/NA	Filter	None	
160-10545-6	WAA-00-AF-FB-20150211	Total/NA	Filter	None	
_CS 160-175374/2-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-175374/1-A	Method Blank	Total/NA	Filter	None	

TestAmerica St. Louis

TestAmerica Job ID: 160-10545-2

Tetra Tech, Inc. DATA VALIDATION REPORT LEVEL II

Site:	West Lake Landfill Site, Bridgeton, Missouri					
Laboratory:	TestAmerica Laboratories, Inc. (Earth City, Missouri)					
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)					
Review Date	March 11, 2015					
Sample Delivery Group (SDG):	J10616					
Sample Numbers:	WAA-01-AF-PS-20150218, WAA-02-AF-PS-20150218, WAA-03-AF-PS-20150218, WAA-04-AF-PS-20150218, WAA-05-AF-PS-20150218, and WAA-00-AF-FB-20150218					
Matrix / Number of Samples:	5 Air Samples and 1 Field Blank					
documents entitled "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review" (9240.1-48), June 2008. In addition, the Tetra Tech document "Review of Data Packages from Subcontracted Laboratories" (February 2002) and the EPA and others document "Multi-Agency Radiological Laboratory Analytical Protocols Manual" (July 2004) were used along with other criteria specified in the applicable methods. The review was intended to identify problems and quality control (QC) deficiencies that were readily apparent from the summary data package. The following sections discuss any problems or deficiencies that were found, and data qualifications applied because of non-compliant QC. The data review was limited to the available field and laboratory QC information submitted with the project-specific data package.						
	alidation criteria outlined in the above-referenced documents were de to the data accorded with those documents.					
Hang N. Elli	11 March 2015					
Certified by Harry Ellis, Chemist	Date					

103I9025140058.000 1 SDG J10616

DATA VALIDATION QUALIFIERS

- U The analyte was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported sample quantitation limit, which is estimated.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

DATA ASSESSMENT

Sample delivery group (SDG) J10616 included five (5) environmental air (filter) samples and one (1) QC samples (a field blank). Samples were analyzed for gross alpha and beta radiation by EPA SW-846 Method 9310 and for cesium-137 and other gamma-emitters by Department of Energy (DOE) Method Ga-01-R. The following summarizes the data validation that was performed.

RADIOANALYTICAL ANALYSES

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 6 months from sample collection to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. LCS and duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blank yielded no detectable activities and the field blank a low beta activity. The other field samples yielded more than 5 times the field blank beta activity, so no qualifications were applied.

IV. Laboratory Control Sample (LCS)

All percent recoveries from the LCS analyses were within established control limits. No qualifications were applied.

V. Surrogates

Surrogates are not used in these radioanalytical methods.

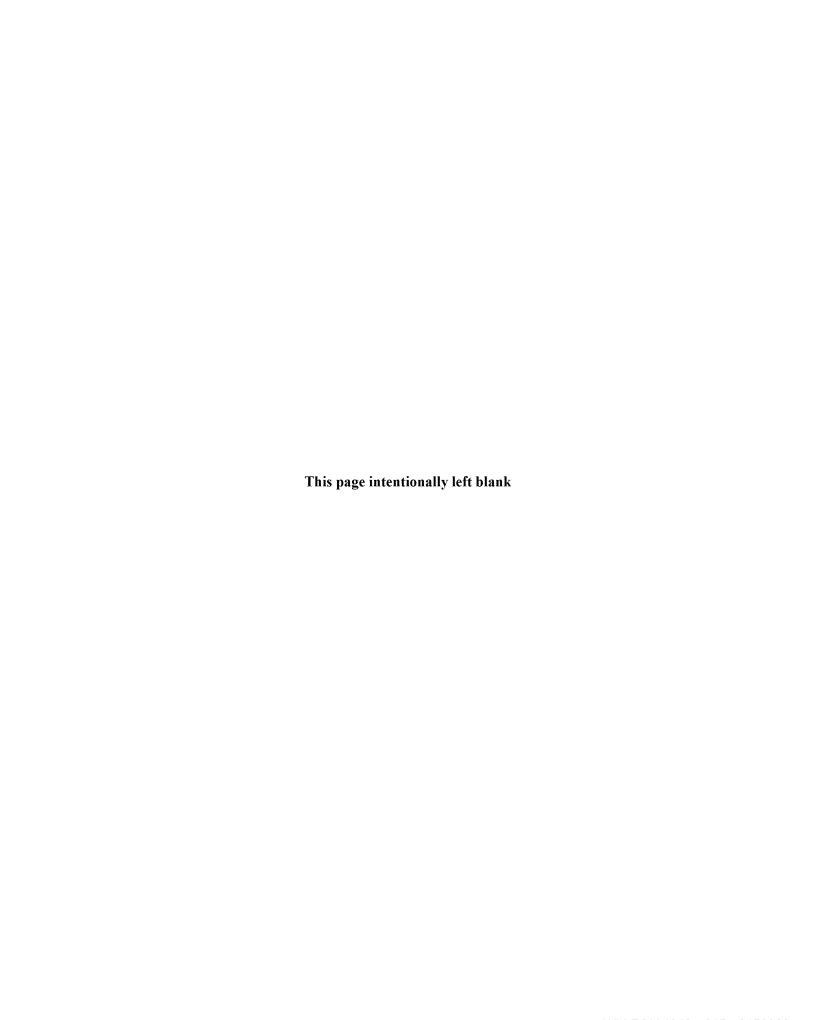
VI. Comments

Some detected activities were less than their reporting limits ("RL"). These extrapolations should be qualified as estimated (flagged "J").

VII. Overall Assessment of Data

Overall data quality is acceptable, with no significant qualifications applied. All data are usable as qualified for their intended purposes.

103J9025140058,000 3 SDG J10616



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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis 13715 Rider Trail North Earth City, MO 63045 Tel: (314)298-8566

TestAmerica Job ID: 160-10616-2

Client Project/Site: West Lake Landfill - Filters

For:

Tetra Tech EM Inc. 415 Oak Street Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Elizabeth M. Abercher

Authorized for release by: 2/26/2015 5:31:11 PM
Elizabeth Hoerchler, Project Mgmt. Assistant elizabeth.hoerchler@testamericainc.com

Designee for

Erika Gish, Project Manager II (314)298-8566 erika.gish@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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QC Association Summary	15

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6

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9

Case Narrative

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10616-2

Job ID: 160-10616-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: West Lake Landfill - Filters

Report Number: 160-10616-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 02/23/2015; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 18.0° C.

GROSS ALPHA AND GROSS BETA RADIOACTIVITY

Samples WAA-01-AF-PS-20150218 (160-10616-1), WAA-02-AF-PS-20150218 (160-10616-2), WAA-03-AF-PS-20150218 (160-10616-3), WAA-04-AF-PS-20150218 (160-10616-4), WAA-05-AF-PS-20150218 (160-10616-5) and WAA-00-AF-FB-20150218 (160-10616-6) were analyzed for Gross Alpha and Gross Beta Radioactivity in accordance with SW846 9310. The samples were prepared and analyzed on 02/24/2015.

Gross Alpha and Gross Beta were detected in method blank MB 160-175610/1-A at levels that were above the method detection limit but below the reporting limit. The values should be considered estimates, and have been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Case Narrative

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10616-2

Job ID: 160-10616-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RADIUM-226 & OTHER GAMMA EMITTERS (GS)

Samples WAA-01-AF-PS-20150218 (160-10616-1), WAA-02-AF-PS-20150218 (160-10616-2), WAA-03-AF-PS-20150218 (160-10616-3), WAA-04-AF-PS-20150218 (160-10616-4), WAA-05-AF-PS-20150218 (160-10616-5) and WAA-00-AF-FB-20150218 (160-10616-6) were analyzed for Radium-226 & Other Gamma Emitters (GS) in accordance with GA-01-R. The samples were prepared on 02/24/2015 and analyzed on 02/25/2015.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TestAmerica St. Louis

13715 Rider Trail North

Chain of Custody Record

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Earth City, MO 63045

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phone 314.298.8566 fax	Regu	latory Pro	gram: []DW [NPDES	[RCR	'A	<u></u>	ther:											TestAmerica Laboratori	es. Inc
Client Contact	Project N	lanager: [ave Kinro	th		Site	Con	itaci	t: Da	eve K	inrot	h	D	ate:	2-23-	15				_	COC No:	
Tetra Tech, Inc.	Tel/Fax:	314-517-67	798			Lab	Con	tact	t: Mi	ke Fı	ranks		c	arrie	r: NA						1of1COC	S
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Sample Identification	Date	Time	G=Grab)	Matrix		Filter	9310 Gross Alpha/Beta	Ą	931	2 3	₹ §			\perp	Ш		_				Sample Specific Notes	3 .
WAA-01-AF-PS-20150218	2/18/15	12:20	Filter	Air	1	Ц	Х	x	х	\times	x x										* 9315 Radium-226 (GFPC)	
WAA-02-AF-PS-20150218	2/18/15	13:05	Filter	Air	1	Ш	X	x	x	x >	$\times \mid x$										contingent upon TAR results	
WAA-03-AF-PS-20150218	2/18/15	12:40	Filter	Air	1	Ш	X	x	x	x >	x x										for all samples	
WAA-04-AF-PS-20150218	2/18/15	12:55	Filter	Air	1	Ш	X	х	x	x >	x x											
WAA-05-AF-PS-20150218	2/18/15	13:15	Filter	Air	1		×	x	X	\times	x x											
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Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=	NaOH; 6=	Other																6 600	155	e e e		
Possible Hazard Identification:						s	amp	le D	ispo	sal (A fee	may	y be a	sses	ssed i	f san	nple	s ar	e reta	ine	i longer than 1 month)	747798, NONE
Are any samples from a listed EPA Hazardous Waste? Please I Comments Section if the lab is to dispose of the sample.	List any EP	A Waste C	odes for the	e sample	in the	1											•				,	,
Non-Hazard Hammable Skin Irritant	Poison	D	□Unkno		****	-	, , ,					_				2	,	-				ļ
Special Instructions/QC Requirements & Comments:	L_Foisoii	D	L_Jonatio	WI				keturr	1 to Cli	ient		L	Dispo	sal by	Lab		L	_JArch	ive for_		Months	
opecial manucionardo requirements a comments:																						
Custody Seals Intact: Yes No	Custody S	coal Max	······································				**********		lC	los 7		(°C)	OF 11	1-		_						
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Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc. Job Number: 160-10616-2

Login Number: 10616 List Source: TestAmerica St. Louis

List Number: 1 Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10616-2

Qualifiers

Rad

Qualifier **Qualifier Description**

Result is less than the sample detection limit.

Glossary

DL, RA, RE, IN

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor

Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample DLC Decision level concentration MDA Minimum detectable activity EDL **Estimated Detection Limit**

MDC Minimum detectable concentration MDL Method Detection Limit ML Minimum Level (Dioxin)

Not Calculated NC

Not detected at the reporting limit (or MDL or EDL if shown) ND

PQL Practical Quantitation Limit

Quality Control QC RER Relative error ratio

RL Reporting Limit or Requested Limit (Radiochemistry)

Relative Percent Difference, a measure of the relative difference between two points RPD

TEF Toxicity Equivalent Factor (Dioxin) TEQ Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10616-2

Method	Method Description	Protocol	Laboratory
9310	Gross Alpha / Beta (GFPC)	SW846	TAL SL
GA-01-R	Cesium-137 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10616-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-10616-1	WAA-01-AF-PS-20150218	Filter	02/18/15 12:20	02/23/15 10:40
160-10616-2	WAA-02-AF-PS-20150218	Filter	02/18/15 13:05	02/23/15 10:40
160-10616-3	WAA-03-AF-PS-20150218	Filter	02/18/15 12:40	02/23/15 10:40
160-10616-4	WAA-04-AF-PS-20150218	Filter	02/18/15 12:55	02/23/15 10:40
160-10616-5	WAA-05-AF-PS-20150218	Filter	02/18/15 13:15	02/23/15 10:40
160-10616-6	WAA-00-AF-FB-20150218	Filter	02/18/15 00:00	02/23/15 10:40

Client: Tetra Tech EM Inc. Project/Site: West Lake Landfill - Filters

Client Sample ID: WAA-01-AF-PS-20150218

TestAmerica Job ID: 160-10616-2

Lab Sample ID: 160-10616-1 Date Collected: 02/18/15 12:20 Matrix: Filter Date Received: 02/23/15 10:40 Method: 9310 - Gross Alpha / Beta (GFPC) Count Total Uncert. Uncert. Analyte Result Qualifier (20+/-) $(2\sigma + / -)$ RL MDC Unit Prepared Analyzed Dil Fac Gross Alpha 0.552 0.298 0.304 10.0 0.350 pCi/Sample 02/24/15 14 42 02/24/15 18 00 **Gross Beta** 19.8 1.26 2.35 10.0 0.440 pCi/Sample 02/24/15 14:42 02/24/15 18:00 Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) Count Uncert. Uncert. Analyte Result Qualifier (20+/-) (2σ+/-) RL MDC Unit Prepared Analyzed Dil Fac Cesium-137 -1.22 W 6.35 6.35 20.0 pCi/Sample 02/24/15 14:44 02/25/15 07:51 Count Total Other Detected Uncert. Uncert. Radionuclides Result Qualifier $(2\sigma + /-)$ $(2\sigma + /-)$ RL. MDC Unit Prepared Analyzed Dil Fac Other Detected None pCi/Sample 02/24/15 14:44 02/25/15 07:51 Radionuclide Client Sample ID: WAA-02-AF-PS-20150218 Lab Sample ID: 160-10616-2 Date Collected: 02/18/15 13:05 Matrix: Filter Date Received: 02/23/15 10:40 Method: 9310 - Gross Alpha / Beta (GFPC) Count Total Uncert. Uncert. Analyte Result Qualifier (20+/-) (20+/-) RL MDC Unit Prepared Analyzed Dil Fac Gross Alpha 0.480 0.275 0.280 10.0 0.323 pCi/Sample 02/24/15 14:42 02/24/15 18:00 **Gross Beta** 15.8 1.12 1.94 10.0 0.370 pCi/Sample 02/24/15 14:42 02/24/15 18:00 Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) Count Total Uncert. Uncert. Analyte Result Qualifier $(2\sigma + /-)$ $(2\sigma + / -)$ RL MDC Unit Prepared Analyzed Dil Fac Cesium-137 -5.76 31.0 31.0 20.0 14.0 pCi/Sample 02/24/15 14:44 02/25/15 07:54 Count Total Other Detected Uncert. Uncert. Radionuclides Result Qualifier $(2\sigma + /-1)$ $(2\sigma */-)$ RLMDC Unit Prepared Analyzed Dil Fac Other Detected None pCi/Sample 02/24/15 14:44 02/25/15 07:54 Radionuclide Client Sample ID: WAA-03-AF-PS-20150218 Lab Sample ID: 160-10616-3 Date Collected: 02/18/15 12:40 Matrix: Filter Date Received: 02/23/15 10:40 Method: 9310 - Gross Alpha / Beta (GFPC) Count Total Uncert. Uncert. Analyte Result Qualifier $(2\sigma + /-)$ (2σ+/_{*}) RL MDC Unit Prepared Dil Fac Analyzed Gross Alpha 0.408 0,274 0.277 10.0 0.357 pCi/Sample 02/24/15 14:42 02/24/15 18:00 **Gross Beta** 18.6 1.21 2.22 10 0 0.386 pCi/Sample 02/24/15 14:42 02/24/15 18:00

TestAmerica St. Louis

VE 11 March 2015

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10616-2

Client Sample ID: WAA-03-AF-PS-20150218

Date Collected: 02/18/15 12:40 Date Received: 02/23/15 10:40 Lab Sample ID: 160-10616-3

Matrix: Filter

			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-0.926	V.	4.96	4.96	(20.0)	9,11	pCi/Sample	02/24/15 14 44	02/25/15 07:53	* Mariana de la constitución de
			Count	Total	-					
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None	and the same and t	and an annual and a second polytraps and an analysis of the second and a second and	e, en antido de en en reconocione presidente integrale de la companya del companya del companya de la companya del companya de la companya de la companya del companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya del companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de l	Sal democratic Service Abbrevia	Standard - The Standard	pCi/Sample	02/24/15 14:44	02/25/15 07:53	1
Radionuclide										

Client Sample ID: WAA-04-AF-PS-20150218

Method: 9310 - Gross Alpha / Beta (GFPC)

Date Collected: 02/18/15 12:55

Date Received: 02/23/15 10:40

Lab Sample ID: 160-10616-4

Matrix: Filter

			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.430	3	0.264	0.269	10.0	0.322	pCi/Sample	02/24/15 14:42	02/24/15 18:00	1
Gross Beta	18.6		1,23	2,23	10.0	0.427	pCi/Sample	02/24/15 14:42	02/24/15 18:00	1
Method: GA-01-R - (Cesium-137 8	& Other Gan	nma Emitters	s (GS)						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-0.509	V	9.41	9,41	(20.0-)	16.3	pCi/Sample	02/24/15 14:44	02/25/15 07:53	1
			Count	Total	New York					
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None			and a second sec	- terresonare among the of		pCi/Sample	02/24/15 14:44	02/25/15 07:53	1

Total

Count

Client Sample ID: WAA-05-AF-P\$-20150218

Date Collected: 02/18/15 13:15

Radionuclide

Date Received: 02/23/15 10:40

Lab Sample ID: 160-10616-5

Matrix: Filter

		ta (GFPC)	Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.645	3	0.325	0.333	10,0	0.380	pCi/Sample	02/24/15 14 42	02/24/15 18 00	1
Gross Beta	17.6	-	1.17	2.11	10.0	0.418	pCi/Sample	02/24/15 14:42	02/24/15 18:00	1
Method: GA-01-R	- Cesium-137 8	& Other Gan	nma Emitters	(GS)						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac

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TestAmerica St. Louis

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2/26/2015

Client. Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10616-2

Client Sample ID: WAA-05-AF-PS-20150218

Date Collected: 02/18/15 13:15 Date Received: 02/23/15 10:40 Lab Sample ID: 160-10616-5

Matrix: Filter

			Count	Total						
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None	a graden de namendo de per que elemente en con-	error de de region de mello de réprojet pela grando del grando deligio.	erry selven over 1000 in decise oer ad decisio de depojon.	Care Mayor Industria	responsible to colorate his problem and the coloration."	pCi/Sample	02/24/15 14:44	02/25/15 09:07	1
Radionuclide										

Client Sample ID: WAA-00-AF-FB-20150218

Date Collected: 02/18/15 00:00 Date Received: 02/23/15 10:40 Lab Sample ID: 160-10616-6

Matrix: Filter

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.167	W	0.224	0.224	(10.0)	0.375	pCi/Sample	02/24/15 14:42	02/24/15 18:00	1
Gross Beta	1.95	Therese are	0.445	0.485	10,0	0.417	pCi/Sample	02/24/15 14:42	02/24/15 18:00	1
Method: GA-01-R -	Cesium-137 &	Other Gan	nma Emitters	(GS)						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(20+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
		U.Z	5.27	5.27	(20.19	9.24	pCi/Sample	02/24/15 14:44	02/25/15 09:06	1
Cesium-137	2.15	N			No. of the last of					
Cesium-137	2.15	~	Count	Total						
Cesium-137 Other Detected	2.15	Y	Count Uncert.	Total Uncert.						
	2.15 Result	*			RL	MDC	Unit	Prepared	Analyzed	Dil Fac

HVG 11 Man 15

QC Sample Results

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

Method: 9310 - Gross Alpha / Beta (GFPC)

Lab Sample ID: MB 160-175610/1-A Client Sample ID: Method Blank

Matrix: Filter

Prep Type: Total/NA Analysis Batch: 175568

Prep Batch: 175610

			Count	iotai						
	MB	MB	Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.4940		0.270	0.276	10.0	0.297	pCi/Sample	02/24/15 14:42	02/24/15 17:59	1
Gross Beta	0.7038		0.309	0.317	10.0	0.394	pCi/Sample	02/24/15 14:42	02/24/15 17:59	1

Lab Sample ID: LCS 160-175610/2-A

Client Sample ID: Lab Control Sample

Matrix: Filter

Analysis Batch: 175568

Prep Type: Total/NA Prep Batch: 175610

TestAmerica Job ID: 160-10616-2

				Total					
	Spike	LCS	LCS	Uncert.					%Rec.
Analyte	Added	Result	Qual	(2σ+/-)	RL	MDC	Unit	%Rec	Limits
Gross Alpha	5.37	5.200		0.991	10.0	0.327	pCi/Samp	97	75 - 125

Lab Sample ID: LCSB 160-175610/3-A

Client Sample ID: Lab Control Sample

Matrix: Filter

Analyte

Gross Beta

Analysis Batch: 175568

Prep Type: Total/NA Prep Batch: 175610

75 - 125

Total LCSB LCSB Spike Uncert.

Added

17.8

Result Qual

18.20

%Rec. RL %Rec Limits MDC Unit

0.439 pCi/Samp

Lab Sample ID: 160-10616-1 DU

Client Sample ID: WAA-01-AF-PS-20150218

102

Matrix: Filter

Analysis Batch: 175568

Prep Type: Total/NA Prep Batch: 175610

Total

 $(2\sigma + / -)$

2.18

10.0

	Sample	Sample	DU	DU	Uncert.					RER
Analyte	Result	Qual	Result	Qual	(2σ+/-)	RL	MDC	Unit	RER	Limit
Gross Alpha	0.552		0.6944		0.320	10.0	0.297	pCi/Samr	 0.23	1
Gross Beta	19.8		19.08		2.27	10.0	0.394	pCi/Samr	0.16	1

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-175612/1-A Client Sample ID: Method Blank

Matrix: Filter

Prep Type: Total/NA

Analysis Batch: 175896									Prep Batch:	175612
			Count	Total						
	MB	MB	Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	2.636	U	4.89	4.89	20.0	8.46	pCi/Sample	02/24/15 14:44	02/25/15 07:50	1
			Count	Total						
Other Detected	MB	MB	Uncert.	Uncert.						
Radionuclides	Result	Qualifier	<i>(</i> 2σ+/- <i>)</i>	<i>(</i> 2σ+/- <i>)</i>	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/Sample	02/24/15 14:44	02/25/15 07:50	1
Radionuclide										

QC Sample Results

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10616-2

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-175612/2-A Client Sample ID: Lab Control Sample

Matrix: Filter

Prep Type: Total/NA Analysis Batch: 175897

Prep Batch: 175612

			Total					
Spike	LCS	LCS	Uncert.					%Rec.
Added	Result	Qual	(2σ+/-)	RL	MDC	Unit	%Rec	Limits
32000	31550		3280		126	pCi/Samp	99	87 ₋ 116
11100	10990		1160	20.0	74.6	pCi/Samr	99	87 _ 120
11600	11760		1190		37.8	pCi/Samr	101	87 _ 115
	Added 32000 11100	Added Result 32000 31550 11100 10990	Added Result Qual 32000 31550 11100 10990	Spike LCS LCS Uncert. Added Result Qual (2σ+/-) 32000 31550 3280 11100 10990 1160	Spike LCS LCS Uncert. Added Result Qual (2σ+/-) RL 32000 31550 3280 11100 10990 1160 20.0	Spike LCS LCS Uncert. Added Result Qual (2σ+/-) RL MDC 32000 31550 3280 126 11100 10990 1160 20.0 74.6	Spike LCS LCS Uncert. Added Result Qual (2σ+/-) RL MDC Unit 32000 31550 3280 126 pCi/Samp 11100 10990 1160 20.0 74.6 pCi/Samp	Added Result Qual (2σ+/-) RL MDC Unit %Rec 32000 31550 3280 126 pCi/Samr 99 11100 10990 1160 20.0 74.6 pCi/Samr 99

Client Sample ID: WAA-01-AF-PS-20150218 Lab Sample ID: 160-10616-1 DU

Matrix: Filter

Prep Type: Total/NA Analysis Batch: 175996

Pren Batch: 175612

i	Analysis Batch	: 1/5896								Prep Batch: 1	1/5012
						Total					
		Sample	Sample	DU	DU	Uncert.					RER
	Analyte	Result	Qual	Result	Qual	(2σ+/-)	RL	MDC	Unit	RER	Limit
	Cesium-137	-1.22	U	1.100	U	4.10	20.0	7.66	pCi/Samr	0.22	1
						Total					
	Other Detected	Sample	Sample	DU	DU	Uncert.					RER
	Radionuclides	Result	Qual	Result	Qual	(2σ+/-)	RL	MDC	Unit	RER	Limit
	Other Detected	None		None					pCi/Samr		
	Radionuclide										

QC Association Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10616-2

D	· A
No	Iu

Prep Batch: 175610

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10616-1	WAA-01-AF-PS-20150218	Total/NA	Filter	None	_
160-10616-1 DU	WAA-01-AF-PS-20150218	Total/NA	Filter	None	
160-10616-2	WAA-02-AF-PS-20150218	Total/NA	Filter	None	
160-10616-3	WAA-03-AF-PS-20150218	Total/NA	Filter	None	
160-10616-4	WAA-04-AF-PS-20150218	Total/NA	Filter	None	
160-10616-5	WAA-05-AF-PS-20150218	Total/NA	Filter	None	
160-10616-6	WAA-00-AF-FB-20150218	Total/NA	Filter	None	
LCS 160-175610/2-A	Lab Control Sample	Total/NA	Filter	None	
LCSB 160-175610/3-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-175610/1-A	Method Blank	Total/NA	Filter	None	

Prep Batch: 175612

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batcl
160-10616-1	WAA-01-AF-PS-20150218	Total/NA	Filter	None	_
160-10616-1 DU	WAA-01-AF-PS-20150218	Total/NA	Filter	None	
160-10616-2	WAA-02-AF-PS-20150218	Total/NA	Filter	None	
160-10616-3	WAA-03-AF-PS-20150218	Total/NA	Filter	None	
160-10616-4	WAA-04-AF-PS-20150218	Total/NA	Filter	None	
160-10616-5	WAA-05-AF-PS-20150218	Total/NA	Filter	None	
160-10616-6	WAA-00-AF-FB-20150218	Total/NA	Filter	None	
LCS 160-175612/2-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-175612/1-A	Method Blank	Total/NA	Filter	None	

Tetra Tech, Inc. DATA VALIDATION REPORT LEVEL II

Site:	West Lake Landfill Site, Bridgeton, Missouri
Laboratory:	TestAmerica Laboratories, Inc. (Earth City, Missouri)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	March 12, 2015
Sample Delivery Group (SDG):	J10707
Sample Numbers:	WAA-01-AF-PS-20150225, WAA-02-AF-PS-20150225, WAA-03-AF-PS-20150225, WAA-04-AF-PS-20150228, WAA-05-AF-PS-20150225, and WAA-00-AF-FB-20150225
Matrix / Number of Samples:	5 Air Samples and 1 Field Blank
Methods Data Review" (9240.1-48) Packages from Subcontracted Laboratory Anderical Radiological Laboratory Anderical Specified in the applicable of the review was intended to identify apparent from the summary data parthat were found, and data qualificate limited to the available field and lab package.	problems and quality control (QC) deficiencies that were readily ckage. The following sections discuss any problems or deficiencies ions applied because of non-compliant QC. The data review was poratory QC information submitted with the project-specific data
	alidation criteria outlined in the above-referenced documents were de to the data accorded with those documents.
Hang N. Elli	12 March 2015
Certified by Harry Ellis, Chemist	Date

103I9025140058.000 1 SDG J10707

DATA VALIDATION QUALIFIERS

- U The analyte was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported sample quantitation limit, which is estimated.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

DATA ASSESSMENT

Sample delivery group (SDG) J10707 included five (5) environmental air (filter) samples and one (1) QC samples (a field blank). Samples were analyzed for gross alpha and beta radiation by EPA SW-846 Method 9310 and for cesium-137 and other gamma-emitters by Department of Energy (DOE) Method Ga-01-R. The following summarizes the data validation that was performed.

RADIOANALYTICAL ANALYSES

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 6 months from sample collection to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. LCS and duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blank yielded low alpha and beta activities, which is unusual, and the field blank a somewhat higher, but still low beta activity. The other field samples yielded more than 10 times the field blank beta activity, so no qualifications were applied.

IV. Laboratory Control Sample (LCS)

All percent recoveries from the LCS analyses were within established control limits. No qualifications were applied.

V. Surrogates

Surrogates are not used in these radioanalytical methods.

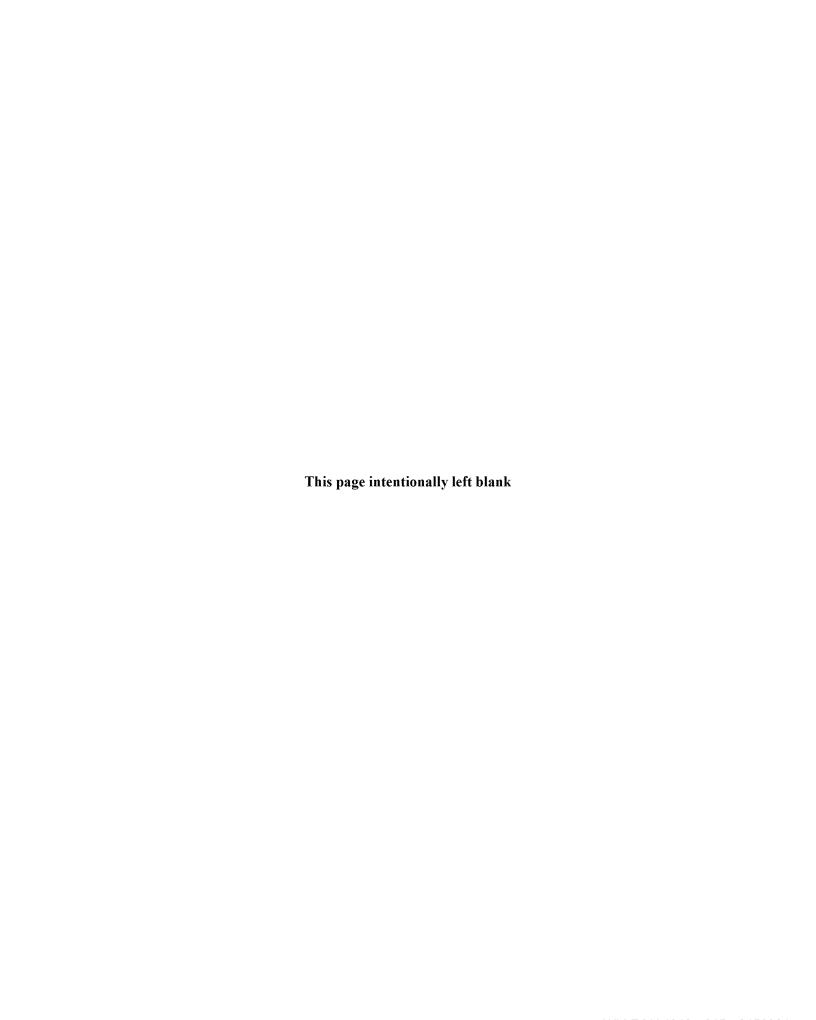
VI. Comments

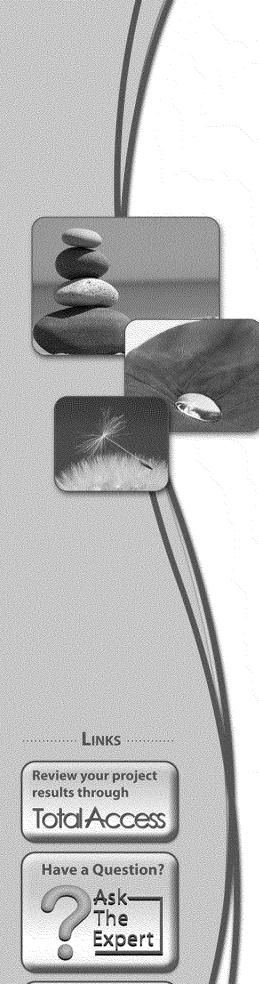
Some detected activities were less than their reporting limits ("RL"). These extrapolations should be qualified as estimated (flagged "J").

VII. Overall Assessment of Data

Overall data quality is acceptable, with no significant qualifications applied. All data are usable as qualified for their intended purposes.

103J9025140058,000 3 SDG J10707





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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis 13715 Rider Trail North Earth City, MO 63045 Tel: (314)298-8566

TestAmerica Job ID: 160-10707-1

Client Project/Site: West Lake Landfill - Filters

For:

Tetra Tech EM Inc. 415 Oak Street Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

al.

Authorized for release by: 3/10/2015 6:48:57 PM

Erika Gish, Project Manager II (314)298-8566 erika.gish@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

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QC Sample Results	13
QC Association Summary	15

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Case Narrative

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10707-1

Job ID: 160-10707-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: West Lake Landfill - Filters

Report Number: 160-10707-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 3/2/2015 10:35 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 18.0° C.

GROSS ALPHA AND GROSS BETA RADIOACTIVITY

Samples WAA-01-AF-PS-20150225 (160-10707-1), WAA-02-AF-PS-20150225 (160-10707-2), WAA-03-AF-PS-20150225 (160-10707-3), WAA-04-AF-PS-20150225 (160-10707-4), WAA-05-AF-PS-20150225 (160-10707-5) and WAA-00-AF-FB-20150225 (160-10707-6) were analyzed for Gross Alpha and Gross Beta Radioactivity in accordance with SW846 9310. The samples were prepared on 03/02/2015 and analyzed on 03/03/2015.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

RADIUM-226 & OTHER GAMMA EMITTERS (GS)

Samples WAA-01-AF-PS-20150225 (160-10707-1), WAA-02-AF-PS-20150225 (160-10707-2), WAA-03-AF-PS-20150225 (160-10707-3), WAA-04-AF-PS-20150225 (160-10707-4), WAA-05-AF-PS-20150225 (160-10707-5) and WAA-00-AF-FB-20150225 (160-10707-6) were

Case Narrative

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

.

Job ID: 160-10707-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

analyzed for Radium-226 & Other Gamma Emitters (GS) in accordance with GA-01-R. The samples were prepared on 03/02/2015 and analyzed on 03/04/2015.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

TestAmerica St. Louis

TestAmerica Job ID: 160-10707-1

TestAmerica St. Louis

Chain of Custody Record

13715 Rider Trail North

WLLFOIA4312 - 015 - 0156326

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

phone 314.298.8566 fax								RCRA Other:												TestAmerica Laboratories, In					
Client Contact			ave Kinro		-	_	Con	tact	t: Da	ive K	inrot	h	Ic)ate:	3-2-1	5			***************************************		C No:				,,
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(816) 816-410-1748 FAX		2 weeks					E E		15	<u> </u>	(GFPC)									Lat	Sampl	ing:	F		
Project Name: West Lake Landfill Site		1	week			≥ 1	g G	Spec	Rad	Jor.	() ()	1 1		-							•	Ŭ	L		
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Sample Identification	Sample Date	Sample Time	(C≃Comp, G=Grab)	Matrix	# of Cont.	iiter	9310 Gross Alpha/Beta	GA-01-R Gamm	9315 Total Alpha Radium	A-01-R Isotopic Thorium	*-01-r Isotopic Urar * 9315 Radium-226						- 1			l	٥	I- O-	Sett &		
WAA-01-AF-PS-20150225	2/25/15	11:06	Filter	Air	1	Ħ	X	T			+	\vdash		=	+	\dashv	= -	+	$\dagger \dagger$				ecific N		=
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WAA-02-AF-PS-20150225	2/25/15	10:18	Filter	Air	1	H	X	T			× ×	\vdash	+	_	1-1	_	\dashv	_	11		tingent		AR res	ults	
WAA-03-AF-PS-20150225	2/25/15	10:42	Filter	Air	1	\sqcup	X	X	X	<u> </u>	<u> </u>			\bot	1	1	_	\bot	$\perp \perp$	for	all sam	ples			
WAA-04-AF-PS-20150225	2/25/15	10:53	Filter	Air	1	Ш	X	X	Х	x >	<u> </u>						\perp	\perp							
WAA-05-AF-PS-20150225	2/25/15	10:30	Filter	Air	1	Ш	X	x	x	x)	x x														
WAA-00-AF-FB-20150225	2/25/15	NA	Filter	Air	1		X	х	х	x >	x x											. 60-1			
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Preservation Used: 1= Ice, 2= HCI, 3= H2SO4; 4=HNO3; 5 Possible Hazard Identification:	=NaOH; 6=	Other																<i>3</i>				ă d	<u> </u>		
Are any samples from a listed EPA Hazardous Waste? Please Comments Section if the lab is to dispose of the sample.	List any EP	A Waste Co	odes for the	sample	in the	ľ	samp	le D	epo	sal (A fee	≘ ma	y be a	asses	ssed	if sa	mple	s are	e retai	ined lo	nger th	i i			
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Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc. Job Number: 160-10707-1

Login Number: 10707 List Source: TestAmerica St. Louis

List Number: 1 Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10707-1

Qualifiers

Rad

Qualifier Qualifier Description

U Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
n	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery

CFL Contains Free Liquid
CNF Contains no Free Liquid

DER Duplicate error ratio (normalized absolute difference)

Dil Fac Dilution Factor

DL, RA, RE, IN Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample

DLC Decision level concentration

MDA Minimum detectable activity

EDL Estimated Detection Limit

MDC Minimum detectable concentration

MDL Method Detection Limit
ML Minimum Level (Dioxin)

NC Not Calculated

ND Not detected at the reporting limit (or MDL or EDL if shown)

PQL Practical Quantitation Limit

QC Quality Control
RER Relative error ratio

RL Reporting Limit or Requested Limit (Radiochemistry)

RPD Relative Percent Difference, a measure of the relative difference between two points

TEF Toxicity Equivalent Factor (Dioxin)
TEQ Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10707-1

Method	Method Description	Protocol	Laboratory
9310	Gross Alpha / Beta (GFPC)	SW846	TAL SL
GA-01-R	Cesium-137 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10707-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-10707-1	WAA-01-AF-PS-20150225	Filter	02/25/15 11:06	03/02/15 10:35
160-10707-2	WAA-02-AF-PS-20150225	Filter	02/25/15 10:18	03/02/15 10:35
160-10707-3	WAA-03-AF-PS-20150225	Filter	02/25/15 10:42	03/02/15 10:35
160-10707-4	WAA-04-AF-PS-20150225	Filter	02/25/15 10:53	03/02/15 10:35
160-10707-5	WAA-05-AF-PS-20150225	Filter	02/25/15 10:30	03/02/15 10:35
160-10707-6	WAA-00-AF-FB-20150225	Filter	02/25/15 00:00	03/02/15 10:35

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10707-1

Lab Sample ID: 160-10707-1

Matrix: Filter

Client Sample ID: WAA-01-AF-PS-20150225

Date Collected: 02/25/15 11:06 Date Received: 03/02/15 10:35

Method: 9310 - Gross Alpha / Beta (GFPC) Count Total Uncert. Uncert. Result Qualifier RL Analyte $(2\sigma + /-)$ (2g+/-) MDC Unit Prepared Analyzed

Dil Fac 0.333 10.0 Gross Alpha 0.751 0.344 0.350 pCi/Sample 03/02/15 15.34 03/03/15 07:55 Gross Beta 29.6 1.53 3.33 10.0 0.440 pCi/Sample 03/02/15 15:34 03/03/15 07:55

RI

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Count Total Uncert. Uncert. Analyte Result Qualifier $(2\sigma + l -)$ $(2\sigma + 1-)$ Cesium-137 0.000 1.42 1.42 Count Total

RL MDC Unit Prepared Analyzed Dil Fac 20.0) pCi/Sample 03/02/15 15:45 03/04/15 08:47 8.03

Other Detected Uncert. Uncert. Radionuclides Result Qualifier $(2\sigma + /-)$ $(2\sigma + /-)$ Other Detected None

MDC Unit Prepared Analyzed Dil Fac pCi/Sample 03/02/15 15:45 03/04/15 08:47

Client Sample ID: WAA-02-AF-PS-20150225

Date Collected: 02/25/15 10:18 Date Received: 03/02/15 10:35

Radionuclide

Lab Sample ID: 160-10707-2

Matrix: Filter

Method: 9310 - Gross Alpha / Beta (GFPC)

Count Total Uncert. Uncert. Result Qualifier $(2\sigma + l - 1)$ RL. Analyte (20+/-) MDC Unit Prepared Analyzed Dil Fac **Gross Alpha** 0.699 0.337 0.346 10.0 0.391 pCi/Sample 03/02/15 15:34 03/03/15 07:56 pCi/Sample **Gross Beta** 24.6 1.40 2.83 10.0 0.407 03/02/15 15:34 03/03/15 07:56

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

None

Count Total Uncert. Uncert. Analyte Result Qualifier $(2\sigma + / -)$ (20+/-) Cesium-137 -0.275 4/ 6.86 6.86 Count Total Other Detected Uncert Uncert.

RL MDC Unit Prepared Analyzed Dil Fac 20.0 128 pCi/Sample 03/02/15 15:45 03/04/15 07:38

Radionuclides Result Qualifier $(2\sigma + /-)$ $(2\sigma + /-)$

MDC Unit RL Prepared Analyzed Dil Fac pCi/Sample 03/02/15 15:45 03/04/15 07:38

Client Sample ID: WAA-03-AF-PS-20150225

Date Collected: 02/25/15 10:42 Date Received: 03/02/15 10:35

Other Detected

Radionuclide

Lab Sample ID: 160-10707-3

Matrix: Filter

Method: 9310 - Gross Alpha / Beta (GFPC) Count Total Uncert. Uncert. Analyte Result Qualifier (20+/-) (20+/-) RL MDC Unit Prepared Analyzed Dil Fac 0.313 0.323 10.0 0,323 pCi/Sample 03/02/15 15 34 03/03/15 07:56 Gross Alpha 0.679 1.52 3.32 10.0 0.370 pCi/Sample 03/02/15 15:34 03/03/15 07:56 **Gross Beta** 29.5

12 March 2015

TestAmerica St. Louis

Page 10 of 15

3/10/2015

Client: Tetra Tech EM Inc. TestAmerica Job ID: 160-10707-1 Project/Site: West Lake Landfill - Filters Client Sample ID: WAA-03-AF-PS-20150225 Lab Sample ID: 160-10707-3 Date Collected: 02/25/15 10:42 Matrix: Filter Date Received: 03/02/15 10:35 Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) Count Total Uncert. Uncert. Analyte Result Qualifier $(2\sigma + /-)$ $(2\sigma + 1-)$ RL MDC Unit Prepared Analyzed Dil Fac 20.0 Cesium-137 3.36 5.90 5,91 pCi/Sample 03/02/15 15:45 03/04/15 07:39 10.0 Count Total Other Detected Uncert. Uncert. Radionuclides Result Qualifier $(2\sigma + /-)$ $(2\sigma + /-)$ MDC Unit RL Prepared Analyzed Dil Fac None Other Detected pCi/Sample 03/02/15 15:45 03/04/15 07:39 Radionuclide Client Sample ID: WAA-04-AF-PS-20150225 Lab Sample ID: 160-10707-4 Date Collected: 02/25/15 10:53 Matrix: Filter Date Received: 03/02/15 10:35 Method: 9310 - Gross Alpha / Beta (GFPC) Count Total Uncert. Uncert. Analyte Result Qualifier (2a+/-) (2σ+/-) RL MDC Unit Prepared Dil Fac Analyzed 10.0 0.354 0.369 pCi/Sample 03/02/15 15:34 Gross Alpha 0.916 0.322 03/03/15 07:56 1.53 3.32 10.0 0.427 pCi/Sample 03/02/15 15:34 03/03/15 07:56 **Gross Beta** 29.4 Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) Count Total Uncert. Uncert. Analyte Result Qualifier $(2\sigma + / -)$ $(2\sigma + /-)$ RL **MDC** Unit Prepared Analyzed Dil Fac Cesium-137 -3.20 16.6 20.0 pCi/Sample 03/02/15 15:45 03/04/15 07 44 W 16.6 Count Total Other Detected Uncert. Uncert. $(2\sigma + /-)$ Radionuclides Result Qualifier $(2\sigma + /-)$ MDC Unit RL Prepared Analyzed Dil Fac pCi/Sample None 03/02/15 15:45 03/04/15 07:44 Other Detected Radionuclide Client Sample ID: WAA-05-AF-PS-20150225 Lab Sample ID: 160-10707-5 Date Collected: 02/25/15 10:30 Matrix: Filter Date Received: 03/02/15 10:35 Method: 9310 - Gross Alpha / Beta (GFPC) Count Total Uncert. Uncert. RL. Dil Fac Analyte Result Qualifier $(2\sigma + /-)$ $(2\sigma + /-)$ MDC Unit Prepared Analyzed 0,371 0.386 10.0 pCi/Sample 03/02/15 15:37 03/03/15 07:56 Gross Alpha 0.929 1.39 2.87 10,0 0,418 pCi/Sample 03/02/15 15:37 03/03/15 07:56 Gross Beta 25.1 Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) Total Count Uncert. Uncert. Result Qualifier $(2\sigma + 1-)$ $(2\sigma + /-)$ MDC Unit Dil Fac Analyte RL Prepared Analyzed Cesium-137 0.000 UN 1.28 1.28 20.0 11.1 pCi/Sample 03/02/15 15 45 03/04/15 07:43

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TestAmerica St. Louis

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3/10/2015

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10707-1

Client Sample ID: WAA-05-AF-PS-20150225

Date Collected: 02/25/15 10:30 Date Received: 03/02/15 10:35 Lab Sample ID: 160-10707-5

Matrix: Filter

			Count	Total						
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(20+/-)	(20+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None		According to the Common Strategic States and Common Strategic States	reprintings, a country gap, in the enterture selection as			pCi/Sample	03/02/15 15 45	03/04/15 07:43	1
Radionuclide										

Client Sample ID: WAA-00-AF-FB-20150225

Date Collected: 02/25/15 00:00

Date Received: 03/02/15 10:35

Lab Sample ID: 160-10707-6

Matrix: Filter

Method: 9310 - Gro	ss Alpha / Be	ta (GFPC)								
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.337	W	0.263	0.266	(10.0)	0.375	pCi/Sample	03/02/15 15:37	03/03/15 07:56	1
Gross Beta	2.35		0.478	0.533	10.0	0.417	pCi/Sample	03/02/15 15.37	03/03/15 07:56	1
Method: GA-01-R -	Cesium-137 8	Cother Gan	nma Emitters	(GS)						
			Count	Total						
			Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-4.27	V	47.4	47.4	(20.0)	16.0	pCi/Sample	03/02/15 15:45	03/04/15 07:42	1
			Count	Total						
Other Detected			Uncert.	Uncert.						
Radionuclides	Result	Qualifier	(20+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None		a announce announce algainment announce or	- var 4 venovo veneramentementementementementementementement	***************************************		pCi/Sample	03/02/15 15:45	03/04/15 07:42	1
Radionuclide										

H.VG 12 May 15

QC Sample Results

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10707-1

Method: 9310 - Gross Alpha / Beta (GFPC)

Lab Sample ID: MB 160-176883/1-A Client Sample ID: Method Blank

Matrix: Filter Prep Type: Total/NA Analysis Batch: 177069

Prep Batch: 176883

			Count	Total						
	MB	MB	Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.4654		0.264	0.269	10.0	0.297	pCi/Sample	03/02/15 15:34	03/03/15 07:55	1
Gross Beta	0.7611		0.316	0.325	10.0	0.394	pCi/Sample	03/02/15 15:34	03/03/15 07:55	1

Lab Sample ID: LCS 160-176883/2-A

Client Sample ID: Lab Control Sample Prep Type: Total/NA

Matrix: Filter

Analysis Batch: 177069 Total Prep Batch: 176883

LCS LCS Spike Uncert. %Rec. Analyte Added Result Qual $(2\sigma + / -)$ RL MDC Unit %Rec Limits Gross Alpha 5.37 5.200 0.991 10.0 0.327 pCi/Samp 97 75 _ 125

Lab Sample ID: LCSB 160-176883/3-A Client Sample ID: Lab Control Sample

Matrix: Filter

Prep Type: Total/NA Analysis Batch: 177069

Prep Batch: 176883

Total Spike LCSB LCSB Uncert. %Rec. Added RL Limits Analyte Result Qual $(2\sigma + / -)$ MDC Unit %Rec Gross Beta 17.8 18.28 2.19 10.0 0.439 pCi/Samp 103 75 - 125

Lab Sample ID: 160-10707-1 DU Client Sample ID: WAA-01-AF-PS-20150225

Matrix: Filter

Analysis Batch: 177069 Prep Batch: 176883

Prep Type: Total/NA

Total Sample Sample DU DU Uncert. RER Analyte Result Qual Result Qual $(2\sigma + / -)$ RL MDC Unit RER Limit Gross Alpha 0.751 1.009 0.381 10.0 0.297 pCi/Samp 0.36 Gross Beta 29.6 31.81 3.55 10.0 0.394 pCi/Samp 0.32

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-176886/1-A Client Sample ID: Method Blank Matrix: Filter Prep Type: Total/NA

Radionuclide

Analysis Batch: 177367 Prep Batch: 176886

Count Total MB MB Uncert. Uncert. Analyte Result Qualifier $(2\sigma + / -)$ $(2\sigma + / -)$ RL MDC Unit Prepared Analyzed Dil Fac 2.770 U Cesium-137 4 58 4 59 20.0 03/02/15 15:45 03/04/15 07:46 7.78 pCi/Sample Count Total Other Detected MB MB Uncert. Uncert. Radionuclides Result Qualifier $(2\sigma +/-)$ $(2\sigma + / -)$ RL MDC Unit Prepared Analyzed Dil Fac None pCi/Sample 03/02/15 15:45 03/04/15 07:46 Other Detected

QC Sample Results

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10707-1

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-176886/2-A Client Sample ID: Lab Control Sample

Matrix: Filter

Analysis Batch: 177366

Prep Type: Total/NA

Prep Batch: 176886

				Total					
	Spike	LCS	LCS	Uncert.					%Rec.
Analyte	Added	Result	Qual	(2σ+/-)	RL	MDC	Unit	%Rec	Limits
Americium-241	32000	31140		3240		120	pCi/Samp	97	87 _ 116
Cesium-137	11100	10840		1140	20.0	66.3	pCi/Samr	98	87 _ 120
Cobalt-60	11600	11360		1150		44.8	pCi/Samr	98	87 ₋ 115

Lab Sample ID: 160-10707-1 DU Client Sample ID: WAA-01-AF-PS-20150225

Total

Uncert.

Matrix: Filter

Analysis Batch: 177371

Sample Sample

Prep Type: Total/NA

Prep Batch: 176886

					RER	
MDC	Unit			RER	Limit	

Analyte Result Qual Result Qual $(2\sigma + / -)$ RL Cesium-137 0.000 U -0.07843 U 6.64 20.0 12.1 pCi/Samp 0.01 Total Other Detected Sample Sample DU DU Uncert. RER Radionuclides Result Qual Result Qual (2\sigma+/-) RL MDC Unit RER Limit

None None pCi/Samp Other Detected

DU DU

Radionuclide

QC Association Summary

Client: Tetra Tech EM Inc.

Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-10707-1

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Prep Batch: 176883

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10707-1	WAA-01-AF-PS-20150225	Total/NA	Filter	None	_
160-10707-1 DU	WAA-01-AF-PS-20150225	Total/NA	Filter	None	
160-10707-2	WAA-02-AF-PS-20150225	Total/NA	Filter	None	
160-10707-3	WAA-03-AF-PS-20150225	Total/NA	Filter	None	
160-10707-4	WAA-04-AF-PS-20150225	Total/NA	Filter	None	
160-10707-5	WAA-05-AF-PS-20150225	Total/NA	Filter	None	
160-10707-6	WAA-00-AF-FB-20150225	Total/NA	Filter	None	
LCS 160-176883/2-A	Lab Control Sample	Total/NA	Filter	None	
LCSB 160-176883/3-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-176883/1-A	Method Blank	Total/NA	Filter	None	

Prep Batch: 176886

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10707-1	WAA-01-AF-PS-20150225	Total/NA	Filter	None	
160-10707-1 DU	WAA-01-AF-PS-20150225	Total/NA	Filter	None	
160-10707-2	WAA-02-AF-PS-20150225	Total/NA	Filter	None	
160-10707-3	WAA-03-AF-PS-20150225	Total/NA	Filter	None	
160-10707-4	WAA-04-AF-PS-20150225	Total/NA	Filter	None	
160-10707-5	WAA-05-AF-PS-20150225	Total/NA	Filter	None	
160-10707-6	WAA-00-AF-FB-20150225	Total/NA	Filter	None	
LCS 160-176886/2-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-176886/1-A	Method Blank	Total/NA	Filter	None	

Tetra Tech, Inc. DATA VALIDATION REPORT LEVEL II

Site:

West Lake Landfill Site, Bridgeton, Missouri

Laboratory:	Pace Analytical Services, Inc. (Lenexa, Kansas)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	March 11, 2015
Sample Delivery Group (SDG):	60186505
Sample Numbers:	WAA-01-RV-PS-20150119, WAA-02-RV-PS-20150119, WAA-03-RV-PS-20150119, WAA-04-RV-PS-20150119, WAA-04-RV-DU-20150119, WAA-05-RV-PS-20150119, and WAA-00-RV-TB-20150119
Matrix / Number of Samples:	5 Air Samples, 1 Field Duplicate Sample, and 1 Trip Blank
documents entitled "Contract Labor Methods Data Review" (9240.1-48) Packages from Subcontracted Labor in the applicable methods. The review was intended to identify apparent from the summary data parthat were found, and data qualifications.	o the U.S. Environmental Protection Agency (EPA) Region 7 ratory Program National Functional Guidelines for Superfund Organic, June 2008. In addition, the Tetra Tech document "Review of Data ratories" (February 2002) was used along with other criteria specified problems and quality control (QC) deficiencies that were readily ckage. The following sections discuss any problems or deficiencies ions applied because of non-compliant QC. The data review was coratory QC information submitted with the project-specific data
	alidation criteria outlined in the above-referenced documents were de to the data accorded with those documents.
Hang N. Elli	11 March 2015
Certified by Harry Ellis, Chemist	Date

103I9025140058.000 1 SDG 60186505

DATA VALIDATION QUALIFIERS

- U The analyte was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported sample quantitation limit, which is estimated.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

DATA ASSESSMENT

Sample delivery group (SDG) 60186505 included five (5) environmental air (adsorbent tube) samples and two (2) QC samples (a field duplicate and a trip blank). Samples were analyzed for selected volatile organic compounds via EPA Air Method TO-17. The following summarizes the data validation that was performed.

VOLATILE ORGANIC COMPOUND ANALYSIS

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 30 days from sample collection by tube to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. Satisfactory LCS and field duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

No analytes were detected in the laboratory (method) blank and the field blank. No qualifications were applied.

IV. Laboratory Control Sample (LCS)

All LCS results were within QC limits. No qualifications were applied.

V. Surrogates

Several samples, including the field blank and the laboratory blank yielded surrogate recoveries above the QC limits. This may indicate over-sensitivity of the detector in the analytical instrument. All positive results in samples with excessive surrogate recoveries were qualified as estimated and flagged "J".

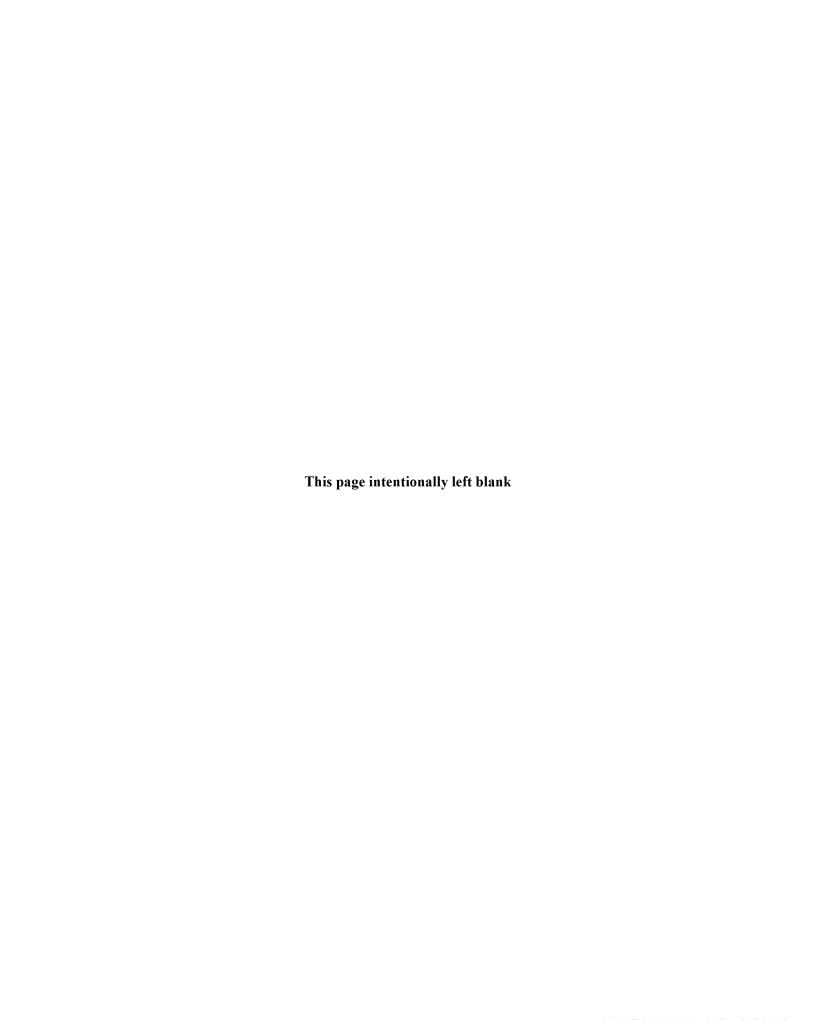
VI. Comments

No analytes were detected in the field samples.

VII. Overall Assessment of Data

Overall data quality is acceptable, with few qualifications added. All data are usable as qualified for their intended purposes.

103J9025140058,000 3 SDG 60186505







February 04, 2015

Emily Fisher TETRA TECH EMI 415 Oak Kansas City, MO 64106

RE: Project: WESTLAKE LANDFILL Pace Project No.: 60186505

Dear Emily Fisher:

Enclosed are the analytical results for sample(s) received by the laboratory on January 20, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Shuri Bosenstange

Sherri Rosenstangle sherri.rosenstangle@pacelabs.com Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665



CERTIFICATIONS

Project: WESTLAKE LANDFILL

Pace Project No.: 60186505

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414

A2LA Certification #: 2926.01 Alaska Certification #: UST-078 Alaska Certification #MN00064 Alabama Certification #40770 Arizona Certification #: AZ-0014 Arkansas Certification #: 88-0680 California Certification #: 01155CA Colorado Certification #Pace

Connecticut Certification #: PH-0256 EPA Region 8 Certification #: 8TMS-L Florida/NELAP Certification #: E87605

Guam Certification #:14-008r Georgia Certification #: 959 Georgia EPD #: Pace

Idaho Certification #: MN00064 Hawaii Certification #MN00064 Illinois Certification #: 200011 Indiana Certification#C-MN-01 lowa Certification #: 368 Kansas Certification #: E-10167

Kansas Certification #: E-10167 Kentucky Dept of Envi. Protection - DW #90062 Kentucky Dept of Envi. Protection - WW #:90062

Louisiana DEQ Certification #: 3086 Louisiana DHH #: LA140001 Maine Certification #: 2013011 Maryland Certification #: 322 Michigan DEPH Certification #: 9909 Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530

North Carolina State Public Health #: 27700

North Dakota Certification #: R-036

Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001

Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C

Wisconsin Certification #: 999407970

REPORT OF LABORATORY ANALYSIS

(913)599-5665



SAMPLE SUMMARY

Project: WESTLAKE LANDFILL

Pace Project No.: 60186505

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60186505001	WAA-01-RV-PS-20150119	Air	01/19/15 14:01	01/20/15 14:06
60186505002	WAA-02-RV-PS-20150119	Air	01/19/15 13:14	01/20/15 14:06
60186505003	WAA-03-RV-PS-20150119	Air	01/19/15 13:40	01/20/15 14:06
60186505004	WAA-04-RV-PS-20150119	Air	01/19/15 13:52	01/20/15 14:06
60186505005	WAA-05-RV-PS-20150119	Air	01/19/15 13:20	01/20/15 14:06
60186505006	WAA-04-RV-DU-20150119	Air	01/19/15 13:52	01/20/15 14:06
60186505007	WAA-00-RV-TB-20150119	Air	01/19/15 13:00	01/20/15 14:06

REPORT OF LABORATORY ANALYSIS





SAMPLE ANALYTE COUNT

Project: WESTLAKE LANDFILL

Pace Project No.: 60186505

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60186505001	WAA-01-RV-PS-20150119	TO-17M	RTP	15	PASI-M
60186505002	WAA-02-RV-PS-20150119	TO-17M	RTP	15	PASI-M
60186505003	WAA-03-RV-PS-20150119	TO-17M	RTP	15	PASI-M
60186505004	WAA-04-RV-PS-20150119	TO-17M	RTP	15	PASI-M
60186505005	WAA-05-RV-PS-20150119	TO-17M	RTP	15	PASI-M
60186505006	WAA-04-RV-DU-20150119	TO-17M	RTP	15	PASI-M
60186505007	WAA-00-RV-TB-20150119	TO-17M	RTP	15	PASI-M

REPORT OF LABORATORY ANALYSIS



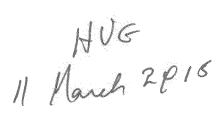
Project:

WESTLAKE LANDFILL

Pace Project No.:

Date: 02/04/2015 06:00 PM

Sample: WAA-01-RV-PS-20150119	Lab ID: 601	186505001	Collected: 01.	/19/15	14:01	Received: 01	1/20/15 14:06 N	Matrix: Air	and the second
Parameters	Results	Units	Report Lin	nit	DF	Prepared	Analyzed	CAS No.	Qual
TO17M VOC MS AIR Passive	Analytical Met	thod; TO-17	M Preparation M	ethod	: TO-1	7M			
Benzene	ND uç	g/m3	0.0)48	1	02/02/15 12:38	02/03/15 16:34	71-43-2	
cis-1,2-Dichloroethene	ND ug	g/m3	0.0	95	1	02/02/15 12:38			
trans-1,2-Dichloroethene	ND ug	g/m3	0.0)48	1	02/02/15 12:38	02/03/15 16:34	156-60-5	
Ethylbenzene	ND ug	g/m3	0.0	48	1	02/02/15 12:38			
Isopropylbenzene (Cumene)	ND ug	g/m3	0.0	148	1	02/02/15 12:38			
Methyl-tert-butyl ether	ND ug	g/m3	0.0	48	1	02/02/15 12:38			
Tetrachloroethene	ND ug	g/m3	0.0	148	1	02/02/15 12:38			
Toluene	0.58 ug	g/m3	0.0	48	1				
Trichloroethene	ND ug		0.0	48	1	02/02/15 12:38			
1,2,4-Trimethylbenzene	ND ug	•	0.0	48	1	02/02/15 12:38			
1,3,5-Trimethylbenzene	ND ug	-	0.0	48	1				
Vinyl chloride	ND ug	-		31	1	02/02/15 12:38			
m&p-Xylene	ND ug	-	0.0		1		02/03/15 16:34		
o-Xylene Surrogates	ND ug	-	0.0		1		02/03/15 16:34		
a,a,a-Trifluorotoluene (S)	124 %	ı .	38-1	50	1	02/02/15 12:38	02/03/15 16:34	98-08-8	





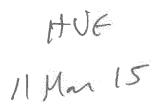
Project:

WESTLAKE LANDFILL

Pace Project No.:

Date: 02/04/2015 06:00 PM

Sample: WAA-02-RV-PS-20150119	Lab ID: 60186	505002 C	ollected: 01/19/1	5 13:14	Received: 01	/20/15 14:06 N	latrix: Air	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO17M VOC MS AIR Passive	Analytical Metho	d: TO-17M P	reparation Metho	d: TO-1	7M			
Benzene	ND ug/m	13	0.048	1	02/02/15 12:38	02/03/15 17:00	71-43-2	
cis-1,2-Dichloroethene	ND ug/m	13	0.095	1	02/02/15 12:38	02/03/15 17:00	156-59-2	
trans-1,2-Dichloroethene	ND ug/m	13	0.048	1	02/02/15 12:38	02/03/15 17:00	156-60-5	
Ethylbenzene	ND ug/m	13	0.048	1	02/02/15 12:38	02/03/15 17:00	100-41-4	
Isopropylbenzene (Cumene)	ND ug/m	13	0.048	1	02/02/15 12:38	02/03/15 17:00	98-82-8	
Methyl-tert-butyl ether	ND ug/m	13	0.048	1	02/02/15 12:38	02/03/15 17:00	1634-04-4	
Tetrachloroethene	ND ug/m	13	0.048	1	02/02/15 12:38	02/03/15 17:00	127-18-4	
Toluene	0.56 ug/m	13	0.048	1	02/02/15 12:38	02/03/15 17:00	108-88-3	
Trichloroethene	ND ug/m	13	0.048	1	02/02/15 12:38	02/03/15 17:00	79-01-6	
1,2,4-Trimethylbenzene	ND ug/m	13	0.048	1	02/02/15 12:38	02/03/15 17:00	95-63-6	
1,3,5-Trimethylbenzene	ND ug/m	13	0.048	1	02/02/15 12:38	02/03/15 17:00	108-67-8	
Vinyl chloride	ND ug/m	13	0.31	1	02/02/15 12:38	02/03/15 17:00	75-01-4	
m&p-Xylene	ND ug/m	13	0.095	1	02/02/15 12:38	02/03/15 17:00	179601-23-1	
o-Xylene S <i>urrogates</i>	ND ug/n	13	0.048	1	02/02/15 12:38	02/03/15 17:00	95-47-6	
a,a,a-Trifluorotoluene (S)	137 %.		38-150	1	02/02/15 12:38	02/03/15 17:00	98-08-8	



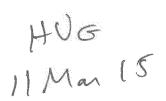


Project

WESTLAKE LANDFILL

Pace Project No.:

Sample: WAA-03-RV-PS-20150119	Lab ID: 601	86505003	Collected: 01/19/	15 13:40	Received: 01	/20/15 14:06 N	fatrix: Air	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO17M VOC MS AIR Passive	Analytical Metl	hod: TO-17N	M Preparation Meth	od: TO-1	7M			
Benzene	ND ug	ı/m3	0.048	1	02/02/15 12:38	02/03/15 17:27	71-43-2	
cis-1,2-Dichloroethene	ND ug	ı/m3	0,095	1	02/02/15 12:38	02/03/15 17:27	156-59-2	
trans-1,2-Dichloroethene	ND ug	ı/m3	0.048	1	02/02/15 12:38	02/03/15 17:27	156-60-5	
Ethylbenzene	ND ug	ı/m3	0.048	1	02/02/15 12:38	02/03/15 17:27	100-41-4	
Isopropylbenzene (Cumene)	ND ug	/m3	0.048	1	02/02/15 12:38	02/03/15 17:27	98-82-8	
Methyl-tert-butyl ether	ND ug	/m3	0.048	1	02/02/15 12:38	02/03/15 17:27	1634-04-4	
Tetrachloroethene	ND ug	j/m3	0.048	1	02/02/15 12:38	02/03/15 17:27	127-18-4	
Toluene	ND ug	J/m3	0.048	1	02/02/15 12:38	02/03/15 17:27	108-88-3	
Trichloroethene	ND ug	j/m3	0.048	1	02/02/15 12:38	02/03/15 17:27	79-01-6	
1,2,4-Trimethylbenzene	ND ug	;/m3	0.048	1	02/02/15 12:38	02/03/15 17:27	95-63-6	
1,3,5-Trimethylbenzene	ND ug	, j/m3	0.048	1	02/02/15 12:38	02/03/15 17:27	108-67-8	
Vinyl chloride	ND ug	, g/m3	0.31	1	02/02/15 12:38	02/03/15 17:27	75-01-4	
m&p-Xylene	ND ug	-	0.095	1	02/02/15 12:38	02/03/15 17:27	179601-23-1	
o-Xylene Surrogates	ND ug	g/m3	0.048	1	02/02/15 12:38	02/03/15 17:27	95-47-6	
a,a,a-Trifluorotoluene (S)	154 %	l.	38-150	1	02/02/15 12:38	02/03/15 17:27	98-08-8	S3





Project:

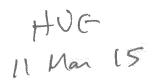
WESTLAKE LANDFILL

Pace Project No.:

Date: 02/04/2015 06:00 PM

601	86505
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Sample: WAA-04-RV-PS-20150119	Lab ID: 601865	505004	Collected: 01/19/	15 13.52	Received: 01	1/20/15 14:06 M	∕latrix: Air	**************************************
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO17M VOC MS AIR Passive	Analytical Method	l: TO-17N	Preparation Metho	od: TO-1	7M			
Benzene	ND ug/m3	3	0.048	1	02/02/15 12:38	02/03/15 17:54	71-43-2	
cis-1,2-Dichloroethene	ND ug/m3	3	0.095	1	02/02/15 12:38			
trans-1,2-Dichloroethene	ND ug/m3	3	0.048	1	02/02/15 12:38			
Ethylbenzene	ND ug/m3	3	0.048	1	02/02/15 12:38			
Isopropylbenzene (Cumene)	ND ug/m3	3	0.048	1	02/02/15 12:38			
Methyl-tert-butyl ether	ND ug/m3	3	0.048	1	02/02/15 12:38			
Tetrachloroethene	ND ug/m3	3	0.048	1	02/02/15 12:38			
Toluene	0.50 ug/m3	3 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	0.048	1	02/02/15 12:38			
Trichloroethene	ND ug/m3		0.048	1	02/02/15 12:38			
1,2,4-Trimethylbenzene	ND ug/m3	3	0.048	1	02/02/15 12:38			
1,3,5-Trimethylbenzene	ND ug/m3	3	0.048	1	02/02/15 12:38			
Vinyl chloride	ND ug/m3	3	0.31	1	02/02/15 12:38			
m&p-Xylene	ND ug/m3	3	0.095	1	02/02/15 12:38			
o-Xylene S <i>urrogates</i>	ND ug/m3	3	0.048	1	02/02/15 12:38			
a,a,a-Trifluorotoluene (S)	180 %.		38-150	1	02/02/15 12:38	02/03/15 17:54	98-08-8	S3





Project

WESTLAKE LANDFILL

Pace Project No.:

Date: 02/04/2015 06:00 PM

60186505

Sample: WAA-05-RV-PS-20150119	Lab ID: 60186505005	Collected: 01/19/15 13:20	Received: 01	/20/15 14:06 N	latrix: Air	
Parameters	Results Units	Report Limit DF	Prepared	Analyzed	CAS No.	Qual
TO17M VOC MS AIR Passive	Analytical Method: TO-17	M Preparation Method: TO-	17M			
Benzene	ND ug/m3	0.048 1	02/02/15 12:38	02/03/15 18:20	71-43-2	
cis-1,2-Dichloroethene	ND ug/m3	0.095 1	02/02/15 12:38	02/03/15 18:20	156-59-2	
trans-1,2-Dichloroethene	ND ug/m3	0.048 1	02/02/15 12:38	02/03/15 18:20	156-60-5	
Ethylbenzene	ND ug/m3	0.048 1	02/02/15 12:38	02/03/15 18:20	100-41-4	
Isopropylbenzene (Cumene)	ND ug/m3	0.048 1	02/02/15 12:38	02/03/15 18:20	98-82-8	
Methyl-tert-butyl ether	ND ug/m3	0.048 1	02/02/15 12:38	02/03/15 18:20	1634-04-4	
Tetrachloroethene	ND ug/m3	0.048 1	02/02/15 12:38	02/03/15 18:20	127-18-4	
Toluene	0.39 ug/m3	0.048 1	02/02/15 12:38	02/03/15 18:20	108-88-3	
Trichloroethene	ND ug/m3	0.048 1	02/02/15 12:38	02/03/15 18:20	79-01-6	
1,2,4-Trimethylbenzene	ND ug/m3	0.048 1	02/02/15 12:38	02/03/15 18:20	95-63-6	
1,3,5-Trimethylbenzene	ND ug/m3	0.048 1	02/02/15 12:38	02/03/15 18:20	108-67-8	
Vinyl chloride	ND ug/m3	0.31 1	02/02/15 12:38	02/03/15 18:20	75-01-4	
m&p-Xylene	ND ug/m3	0.095 1	02/02/15 12:38	02/03/15 18:20	179601-23-1	
o-Xylene Surrogates	ND ug/m3	0.048 1	02/02/15 12:38	02/03/15 18:20	95-47-6	
a,a,a-Trifluorotoluene (S)	157 %.	38-150 1	02/02/15 12:38	02/03/15 18:20	98-08-8	S3

HVG 11 Man 15

REPORT OF LABORATORY ANALYSIS

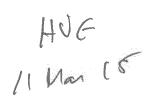


Project:

WESTLAKE LANDFILL

Pace Project No.:

Sample: WAA-04-RV-DU-20150119	Lab ID: 6018650	05006 Collected: 01/19	/15 13:52	Received: 01	/20/15 14:06 N	/latrix: Air	
Parameters	Results	Units Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO17M VOC MS AIR Passive	Analytical Method:	TO-17M Preparation Met	hod: TO-1	7M			
Benzene	ND ug/m3	0.04	3 1	02/02/15 12:38	02/03/15 18:47	71-43-2	
cis-1,2-Dichloroethene	ND ug/m3	0.09	5 1	02/02/15 12:38	02/03/15 18:47	156-59-2	
trans-1,2-Dichloroethene	ND ug/m3	0.04	3 1	02/02/15 12:38	02/03/15 18:47	156-60-5	
Ethylbenzene	ND ug/m3	0.04	3 1	02/02/15 12:38	02/03/15 18:47	100-41-4	
Isopropylbenzene (Cumene)	ND ug/m3	0,04	3 1	02/02/15 12:38	02/03/15 18:47	98-82-8	
Methyl-tert-butyl ether	ND ug/m3	0.04	3 1	02/02/15 12:38	02/03/15 18:47	1634-04-4	
Tetrachloroethene	ND ug/m3	0.04	3 1	02/02/15 12:38	02/03/15 18:47	127-18-4	
Toluene	0.56 ug/m3	0.04	3 1	02/02/15 12:38	02/03/15 18:47	108-88-3	
Trichloroethene	ND ug/m3	0.04	3 1	02/02/15 12:38	02/03/15 18:47	79-01-6	
1,2,4-Trimethylbenzene	ND ug/m3	0.04	3 1	02/02/15 12:38	02/03/15 18:47	95-63-6	
1,3,5-Trimethylbenzene	ND ug/m3	0.04	3 1	02/02/15 12:38	02/03/15 18:47	108-67-8	
Vinyl chloride	ND ug/m3	0.3	1 1	02/02/15 12:38	02/03/15 18:47	75-01-4	
m&p-Xylene	ND ug/m3	0.09	5 1	02/02/15 12:38	02/03/15 18:47	179601-23-1	
o-Xylene Surrogates	ND ug/m3	0.04	3 1	02/02/15 12:38	02/03/15 18:47	95-47-6	
a,a,a-Trifluorotoluene (S)	130 %.	38-15	0 1	02/02/15 12:38	02/03/15 18:47	98-08-8	



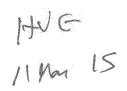


Project:

WESTLAKE LANDFILL

Pace Project No.:

Sample: WAA-00-RV-TB-20150119	Lab ID: 601865050	007 Collected: 01/19/	5 13:00	Received: 01	/20/15 14:06 N	/latrix: Air	
Parameters	Results Un	its Report Limit	DF	Prepared	Analyzed	CAS No	Qual
TO17M VOC MS AIR Passive	Analytical Method: TO	0-17M Preparation Metho	od: TO-1	7M			
Benzene	ND ug/m3	0.047	1	02/02/15 12:38	02/03/15 19:14	71-43-2	
cis-1,2-Dichloroethene	ND ug/m3	0.095	1	02/02/15 12:38	02/03/15 19:14	156-59-2	
rans-1,2-Dichloroethene	ND ug/m3	0.047	1	02/02/15 12:38	02/03/15 19:14	156-60-5	
Ethylbenzene	ND ug/m3	0.047	1	02/02/15 12:38	02/03/15 19:14	100-41-4	
sopropylbenzene (Cumene)	ND ug/m3	0.047	1	02/02/15 12:38	02/03/15 19:14	98-82-8	
Methyl-tert-butyl ether	ND ug/m3	0.047	1	02/02/15 12:38	02/03/15 19:14	1634-04-4	
Tetrachloroethene	ND ug/m3	0.047	1	02/02/15 12:38	02/03/15 19:14	127-18-4	
l'oluene	ND ug/m3	0.047	1	02/02/15 12:38	02/03/15 19:14	108-88-3	
Frichloroethene	ND ug/m3	0.047	1	02/02/15 12:38	02/03/15 19:14	79-01-6	
1,2,4-Trimethylbenzene	ND ug/m3	0.047	1	02/02/15 12:38	02/03/15 19:14	95-63-6	
I,3,5-Trimethylbenzene	ND ug/m3	0.047	1	02/02/15 12:38	02/03/15 19:14	108-67-8	
Vinyl chloride	ND ug/m3	0.31	1	02/02/15 12:38	02/03/15 19:14	75-01-4	
m&p-Xylene	ND ug/m3	0.095	1	02/02/15 12:38	02/03/15 19:14	179601-23-1	
o-Xylene	ND ug/m3	0.047	1	02/02/15 12:38	02/03/15 19:14	95-47-6	
Surrogates							
a,a,a-Trifluorotoluene (S)	241 %.	38-150	1	02/02/15 12:38	02/03/15 19:14	98-08-8	S3



(913)599-5665



QUALITY CONTROL DATA

Project: WESTLAKE LANDFILL

Pace Project No.: 60186505

Date: 02/04/2015 06:00 PM

QC Batch: AIR/22410 Analysis Method: TO-17M

QC Batch Method: TO-17M Analysis Description: TO17 MSS AIR

Associated Lab Samples: 60186505001, 60186505002, 60186505003, 60186505004, 60186505005, 60186505006, 60186505007

METHOD BLANK: 1892528 Matrix: Air

Associated Lab Samples: 60186505001, 60186505002, 60186505003, 60186505004, 60186505005, 60186505006, 60186505007

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/m3	ND ND	3.2	02/03/15 15:40	
1,3,5-Trimethylbenzene	ug/m3	ND	3.2	02/03/15 15:40	
Benzene	ug/m3	ND	3.2	02/03/15 15:40	
cis-1,2-Dichloroethene	ug/m3	ND	6.4	02/03/15 15:40	
Ethylbenzene	ug/m3	ND	3.2	02/03/15 15:40	
Isopropylbenzene (Cumene)	ug/m3	ND	3.2	02/03/15 15:40	
m&p-Xylene	ug/m3	ND	6.4	02/03/15 15:40	
Methyl-tert-butyl ether	ug/m3	ND	3.2	02/03/15 15:40	
o-Xylene	ug/m3	ND	3.2	02/03/15 15:40	
Tetrachloroethene	ug/m3	ND	3.2	02/03/15 15:40	
Toluene	ug/m3	ND	3.2	02/03/15 15:40	
trans-1,2-Dichloroethene	ug/m3	ND	3.2	02/03/15 15:40	
Trichloroethene	ug/m3	ND	3.2	02/03/15 15:40	
Vinyl chloride	ug/m3	ND	20.8	02/03/15 15:40	
a,a,a-Trifluorotoluene (S)	%.	164	38-150	02/03/15 15:40	S3

LABORATORY CONTROL SAMPL	LE & LCSD: 1892529		18	392530						
		Spike	LCS	LCSD	LCS	LCSD	% Rec		Max	
Parameter	Units	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qualifiers
1,2,4-Trimethylbenzene	ug/m3	3330	3150	3260	95	98	53-125	3	30	
1,3,5-Trimethylbenzene	ug/m3	3330	3190	3480	96	104	61-125	9	30	
Benzene	ug/m3	2080	2310	2180	111	105	30-150	6	30	
cis-1,2-Dichloroethene	ug/m3	2160	2220	2050	102	95	30-150	8	30	
Ethylbenzene	ug/m3	2450	2440	2600	99	106	62-135	6	30	
Isopropylbenzene (Cumene)	ug/m3	2870	2770	3020	96	105	63-135	9	30	
m&p-Xylene	ug/m3	5120	4640	4890	91	95	61-128	5	30	
Methyl-tert-butyl ether	ug/m3	2560	2690	2430	105	95	30-150	10	30	
o-Xylene	ug/m3	2380	1920	2110	81	89	60-125	9	30	
Tetrachloroethene	ug/m3	2830	2740	2850	97	101	54-139	4	30	
Toluene	ug/m3	2250	2090	2100	93	93	58-134	1	30	
trans-1,2-Dichloroethene	ug/m3	2160	2070	1960	96	91	30-150	6	30	
Trichloroethene	ug/m3	2420	2650	2520	110	104	40-150	5	30	
Vinyl chloride	ug/m3	5410	4400	3780	81	70	30-150	15	30	
a,a,a-Trifluorotoluene (S)	%.				109	105	38-150		30	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS





QUALIFIERS

Project: WESTLAKE LANDFILL

Pace Project No.: 60186505

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

Date: 02/04/2015 06:00 PM

Surrogate recovery exceeded laboratory control limits. Analyte presence below reporting limits in associated samples. Results unaffected by high bias.

REPORT OF LABORATORY ANALYSIS





QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: WESTLAKE LANDFILL

Pace Project No.: 60186505

Date: 02/04/2015 06:00 PM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60186505001	WAA-01-RV-PS-20150119	TO-17M	AIR/22410	 TO-17M	AIR/22411
60186505002	WAA-02-RV-PS-20150119	TO-17M	AIR/22410	TO-17M	AIR/22411
60186505003	WAA-03-RV-PS-20150119	TO-17M	AIR/22410	TO-17M	AIR/22411
60186505004	WAA-04-RV-PS-20150119	TO-17M	AIR/22410	TO-17M	AIR/22411
60186505005	WAA-05-RV-PS-20150119	TO-17M	AIR/22410	TO-17M	AIR/22411
60186505006	WAA-04-RV-DU-20150119	TO-17M	AIR/22410	TO-17M	AIR/22411
60186505007	WAA-00-RV-TB-20150119	TO-17M	AIR/22410	TO-17M	AIR/22411

REPORT OF LABORATORY ANALYSIS

		Document Na		Document Revised: 26Dec.	2013
/ Pace An	alytical*	Air Sample Condition L Document N	THE THE PERSON NAMED IN TH	Page 1 of 1 Issuing Authority:	parameter and a second and a se
	ury nour	F-MN-A-106-re	ev.09	Pace Minnesota Quality O	ffice
ir Sample Condition Client I Upon Receipt Courier: Fed Ex	Pace KS	Pro		#:601865 	05
Commo	ercial	Other:	601865	05	
Custody Seal on Cooler/Box Pro	esent? Ves [No Seals Intac	t? 🛮 Yes 🗘 No	Optional: Proj. Due Date:	Proj. Name:
acking Material: Drubble V	Vrap Bubble Ba	- Mari		3.10	Blank rec: Ves No
emp. (TO17 and TO13 samples on	ly) (°c): 8.5 (Corrected Temp (°C):	S Thermom, Used:	□888A912167504 ■888A9132521491	☐72337080 ☐80512447
Temp should be above freezing to	6°C Correction Facto	r: true	Date & Initials of	Person Examining Contents:	82/2015
pe of ice Received Blue					
				Comments:	
Chain of Custody Present?		ØYes □No []n/a 1.		
Chain of Custody Filled Out?		ZYes □No []n/a 2.		
Chain of Custody Relinquished?		□Yes □No· [□n/a 3.		
Sampler Name and/or Signature	e on COC?	□Yes □No []N/A 4.		
Samples Arrived within Hold Tir		✓Yes □No [□N/A 5.		
Short Hold Time Analysis (<72 l]n/a 6.		
Rush Turn Around Time Reque		□Yes ⊭No [□N/A 7.		
Sufficient Volume?			□n/A 8.		
Correct Containers Used?		☑Yes □No []N/A 9.		
-Pace Containers Used?			□N/A		
Containers Intact?]N/A 10.	in the second se	*
Media: YDT			11.		
Sample Labels Match COC?		Yes No [JN/A 12.		
	A CONTRACTOR OF THE CONTRACTOR				
Samples Received:					Name C
Canisters			ntrollers	Stand A	Can ID
Sample Number	Can ID	Sample Number	Can ID	Sample Number	Can ID
		Are policina monto de la apprincipación de la compansión de la compansión de la compansión de la compansión de			
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Person Contacted Comments/Resolution	terry	Done	Date/Time:	Field Data Required?	□Yes □No
	1/5	7		<u> </u>	reaction and the contract of t
		No.			
Project Manager Review:	\sqrt{MK}		Date:		Continue of the continue of th
ote: Whenever there is a discrepa			copy of this form will be se	ent to the North Carolina DEHNR	certification Office (i.e. o

WLLFOIA4312 - 015 - 0156356



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section Required	A Client Information:	Section B Required f		Inform	sation:				THE RESERVE AND ADDRESS OF THE PERSON NAMED IN	e informa		uz downer (est fil						Page:	1	of	1	
Company	: Tetra Tech EMI	Report To:	Emil	y Fish	ner .			tations and the	Albent	ion:	Emily Fisher					1.7						
Address:	415 Oak	Copy To:							Comp	any Nan	e: Tetra Tech	ė .			REGUL	ATOR)	(AGENC)	Y				
	Kansas City, MO 64106			-			-	***************************************	Addre	:SS:	415 Oak St, Kansa	s City,	MO	4106	□ NP	DES	GROUI	ND WAT	ER I	DRINKING	WATER	
Email To:		Purchase 0	Order N	lo.:	1111499				Page C Refere						r us	Т	RCRA		Г	OTHER		
	(816) 412-1755 Fax:	Project Na	me:	Wes	t Lake La	ndfill			Pace F	roject	Sherri Rosenstangl	6			Site Lo	cation						
	ed Due Date/TAT:	Project Nu	mber:					-	Manag Pace f	rofile #:	970.8		***************************************		\$	TATE:	MC	, 				
					and the second s							100	Rec	uested	Analysi	Filter	ed (Y/N)	///				
			Ι_			***************************************	and of the same of			lΨ		TNU.	T									
	Section D Valid Matrix Required Client Information MATRIX	Codes CODE	(see valid codes to left)	C=COMP)		COLLE	CTED		(83	AVERAGE SAMPLING TEMPERATURE (°C)		3					_ _	+				
	Drinking water Water	DW WT	sepo	0					SAMPLING TIME (MINUTES)	ER	00000											
	WASTE WATER PRODUCT	P SL	valido		SAMPLING DATE/T	IME	SAMPLING DATE/TI	ME ME	8	EM	fr. :							Residual Chlorine (Y/N)	out of the second			4
	SOIL/SOUD OIL	OL WP AR	(866)	(G=GRAB			·····		N N	200	TUBE SERIAL NUMBER	Test	9					er!		1018		. [
	SAMPLE ID WIPE AIR (A-Z, D-9 / -) OTHER	OT TS	8	1 1					8	MPL	HOMBER	1	TO-17 Passive							a KV	200	~
	Sample IDs MUST BE UNIQUE TISSUE	, ,	CODE	TYPE			1 4 4	r	AMP	ESA		Ž	E S					laal (l: (0013	y J.	
#			MATRIX	SAMPLE	didinionoseeee			:	AL S	RAG		Analysis	5					pise		X.		
ITEM#			MA	SAN	DATE	TIME	DATE	TIME	TOTAL	\$0		<u> </u>	잍					Œ	Pac	e Project	No.J Lab	LD.
	WAA-01-RV-PS-20150119		AR		1/5/14	14:06	1/19/15	14:01	545755	-1.7	187FG		X.	44-				+				
2	WAA-02-RV-PS-20150119		AR		1/5/14	13:09	1/19/15	13:14	545765	-1.7	198FG		X.	4-4-				+				
3	WAA-03-RV-PS-20150119		AR		1/5/14	13:30	1/19/15	13:40	545770	-1.7	199FG	4	X.	4-4-				++	-			
	WAA-04-RV-PS-20150119		AR		1/5/14	13:43	1/19/15	13:52	545769	-1.7	. 200FG		X		-							
5	WAA-05-RV-PS-20150119		AR		1/5/14	13:19	1/19/15	13;20	545761	-1.7	201FG	-	X	+				++	1			
6	WAA-04-RV-DU-20150119		AR		1/5/14	13:43	1/19/15	13:52	545769	-1.7	202FG	_ ** a	X.	++				++	 			
773	WAA-00-RV-TB-20150119		AR		1/5/14	12:06	1/19/15	13:00	NA.	NA	203FG	-	× -					++	+			
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17 of 17



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section Require	n A ed Client Information:	Section B Required Pro	-						tion C ce Inform	ation:								Pag	ge: 1	of	1	Page
ompar	ny: Tetra Tech EMI	Report To: E	mily F	isher				Atten	ition:	Emily Fisher				7				-				
ddress	s: 415 Oak	Copy To:						Com	pany Nar	ne: Tetra Tech				RE	GULA	rory.	AGENC	:Y				
	Kansas City, MO 64106	1						Addr	ess:	415 Oak St, Kansa	s Cit	y, M	0 64106	g argent	NPDE	s r	GROL	JND W	ATER [DRINKIN	3 WAT	ER
mail T	o: Emily.Fisher@tetratech.com	Purchase Ord	er No.:	1111499	9			Pace Refere						1-	UST	Manage	RCRA			OTHER		
hone:	(816) 412-1755 Fax:	Project Name	· W	est Lake La	andfill	··········		Pace	Project	Sherri Rosenstangi	e			Si	te Loca	tion						
eques	ited Due Date/TAT:	Project Numb	er:					Manag Pace I		970.8				-	STA		. M	0				
-									***************************************			R	equeste	d Ana			(Y/N)	E				
ITEM#	Section D Required Client Information Required Client Information MATRIX DRINKING WATER WASTE WATER WASTE	CODE DW WT WW P SL OL WP AR OT TS	SAMPLE TYPE (G=GRAB C=COMP)	DATE	IG END TIME	SAMPLING DATE	3 END IME	TOTAL SAMPLING TIME (MINUTES)	AVERAGE SAMPLING TEMPERATURE (*C)	TUBE SERIAL NUMBER	Analysis Test								Residual Chlorine (Y/N)	ce Project	No.(1.s	ab I D
1	WAA-01-RV-PS-20150119		R	1/5/15	14:06	1/19/15	14:01	20155	-1.7	197FG		×	++	+	+	\vdash	++	++		e i ioject	10.7 LC	10 1.0.
2	WAA-02-RV-PS-20150119		R R	1/5/15	13:09	1/19/15	13:14	20165	-1.7	198FG	1	x	$\dashv \dagger$	11	\top	H	$\dagger \dagger$	+	1			
3	WAA-03-RV-PS-20150119		R	1/5/15	13:30	1/19/15	13:40	20170	-1.7	199FG	1	x	$\dashv \dagger$	11	_		TT	$\dagger \dagger$				
4	WAA-04-RV-PS-20150119		R	1/5/15	13:43	1/19/15	13:52	20169	-1.7	200FG	1	x	11	11	\top		††	TT				
5	WAA-05-RV-PS-20150119	A	ıR	1/5/15	13:19	1/19/15	13:20	20161	-1.7	201FG	1	x		11	1		11	$\top \uparrow$				
6	WAA-04-RV-DU-20150119	A	R	1/5/15	13:43	1/19/15	13:52	20169	-1.7	202FG	1	x		77	1			11		*	***************************************	
7	WAA-00-RV-TB-20150119	A	R	1/5/15	12:06	1/19/15	13:00	NA	NA	203FG	1	x		11	1		11			************************		
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Tetra Tech, Inc. DATA VALIDATION REPORT LEVEL II

Site:

West Lake Landfill Site, Bridgeton, Missouri

Laboratory:	Pace Analytical Services, Inc. (Lenexa, Kansas)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	March 10, 2015
Sample Delivery Group (SDG):	60187573
Sample Numbers:	WAA-01-RV-PS-20150204, WAA-02-RV-PS-20150204, WAA-03-RV-PS-20150204, WAA-04-RV-PS-20150204, WAA-04-RV-DU-20150204, WAA-05-RV-PS-20150204, and WAA-00-RV-TB-20150204
Matrix / Number of Samples:	5 Air Samples, 1 Field Duplicate Sample, and 1 Trip Blank
Methods Data Review" (9240.1-48) Packages from Subcontracted Labor in the applicable methods. The review was intended to identify apparent from the summary data parthat were found, and data qualifications.	atory Program National Functional Guidelines for Superfund Organic, June 2008. In addition, the Tetra Tech document "Review of Data ratories" (February 2002) was used along with other criteria specified problems and quality control (QC) deficiencies that were readily ckage. The following sections discuss any problems or deficiencies ions applied because of non-compliant QC. The data review was coratory QC information submitted with the project-specific data
	alidation criteria outlined in the above-referenced documents were de to the data accorded with those documents.
Hang N. Elli	10 March 2015
Certified by Harry Ellis, Chemist	Date

DATA VALIDATION QUALIFIERS

- U The analyte was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported sample quantitation limit, which is estimated.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

DATA ASSESSMENT

Sample delivery group (SDG) 60187573 included five (5) environmental air (adsorbent tube) samples and two (2) QC samples (a field duplicate and a trip blank). Samples were analyzed for selected volatile organic compounds via EPA Air Method TO-17. The following summarizes the data validation that was performed.

VOLATILE ORGANIC COMPOUND ANALYSIS

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 30 days from sample collection by tube to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. Satisfactory LCS and field duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

No analytes were detected in the laboratory (method) blank or the field blank. No qualifications were applied.

IV. Laboratory Control Sample (LCS)

Almost all LCS results were within QC limits. However, methyl tert-butyl ether (MTBE) yielded a recovery of 141 percent, above QC limits of 70 to 130 percent. MTBE was not detected in the field samples so no qualifications were applied.

V. Surrogates

All surrogate recoveries were within QC limits. No qualifications were applied.

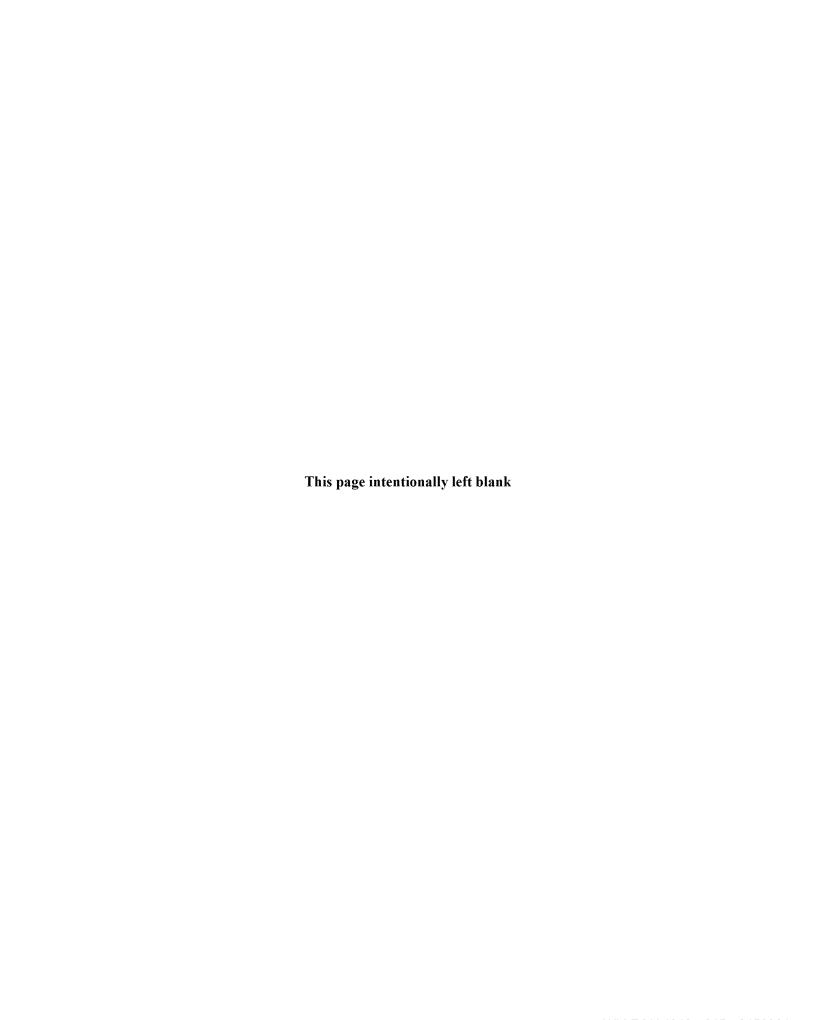
VI. Comments

No analytes were detected in the field samples.

VII. Overall Assessment of Data

Overall data quality is acceptable, with no qualifications added. All data are usable as reported for their intended purposes.

103J9025140058,000 3 SDG 60187573







February 25, 2015

Emily Fisher TETRA TECH EMI 415 Oak Kansas City, MO 64106

RE: Project: WEST LAKE LANDFILL Pace Project No.: 60187573

Dear Emily Fisher:

Enclosed are the analytical results for sample(s) received by the laboratory on February 06, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Shui Dosenstande

Sherri Rosenstangle sherri.rosenstangle@pacelabs.com Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665



CERTIFICATIONS

Project: WEST LAKE LANDFILL

Pace Project No.: 60187573

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414

A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256

Connecticut Certification #: PH-0256 EPA Region 8 Certification #: 8TMS-L Florida/NELAP Certification #: E87605

Guam Certification #:14-008r Georgia Certification #: 959 Georgia EPD #: Pace

Idaho Certification #: MN00064 Hawaii Certification #MN00064 Illinois Certification #: 200011 Indiana Certification#C-MN-01 lowa Certification #: 368 Kansas Certification #: E-10167

Kansas Certification #: E-10167 Kentucky Dept of Envi. Protection - DW #90062 Kentucky Dept of Envi. Protection - WW #:90062

Louisiana DEQ Certification #: 3086 Louisiana DHH #: LA140001 Maine Certification #: 2013011 Maryland Certification #: 322 Michigan DEPH Certification #: 9909 Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530

North Carolina State Public Health #: 27700

North Dakota Certification #: R-036

Ohio EPA #: 4150

Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification

Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C

Wisconsin Certification #: 999407970

REPORT OF LABORATORY ANALYSIS





SAMPLE SUMMARY

Project: WEST LAKE LANDFILL

Pace Project No.: 60187573

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60187573001	WAA-01-RV-PS-20150204	Air	02/04/15 14:07	02/06/15 09:45
60187573002	WAA-02-RV-PS-20150204	Air	02/04/15 13:29	02/06/15 09:45
60187573003	WAA-03-RV-PS-20150204	Air	02/04/15 13:50	02/06/15 09:45
60187573004	WAA-04-RV-PS-20150204	Air	02/04/15 13:57	02/06/15 09:45
60187573005	WAA-05-RV-PS-20150204	Air	02/04/15 13:37	02/06/15 09:45
60187573006	WAA-04-RV-DU-20150204	Air	02/04/15 13:57	02/06/15 09:45
60187573007	WAA-00-RV-TB-20150204	Air	02/04/15 14:14	02/06/15 09:45

REPORT OF LABORATORY ANALYSIS





SAMPLE ANALYTE COUNT

Project: WEST LAKE LANDFILL

Pace Project No.: 60187573

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60187573001	WAA-01-RV-PS-20150204	TO-17M	RTP	13	PASI-M
60187573002	WAA-02-RV-PS-20150204	TO-17M	RTP	13	PASI-M
60187573003	WAA-03-RV-PS-20150204	TO-17M	RTP	13	PASI-M
60187573004	WAA-04-RV-PS-20150204	TO-17M	RTP	13	PASI-M
60187573005	WAA-05-RV-PS-20150204	TO-17M	RTP	13	PASI-M
60187573006	WAA-04-RV-DU-20150204	TO-17M	RTP	13	PASI-M
60187573007	WAA-00-RV-TB-20150204	TO-17M	RTP	13	PASI-M

REPORT OF LABORATORY ANALYSIS



Project:

WEST LAKE LANDFILL

Pace Project No.:

60187573

Sample: WAA-01-RV-PS-20150204	Lab ID: 601	87573001	Collected: 02/04/1	5 14:07	Received: 02	2/06/15 09:45	Matrix: Air	**************************************
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO17M VOC MS AIR Passive	Analytical Met	hod: TO-17N	Preparation Metho	d: TO-1	7M			
cis-1,2-Dichloroethene	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 12:34	1 156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 12:34	1 156-60-5	
Ethylbenzene	0.19	ug/m3	0.095	1	02/11/15 08:08	02/11/15 12:34	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 12:34	98-82-8	
Methyl-tert-butyl ether	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 12:34	1 1634-04-4	CH,L1
Tetrachloroethene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 12:34	1 127-18-4	•
Trichloroethene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 12:34	79-01-6	
1,2,4-Trimethylbenzene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 12:34	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 12:34	108-67-8	
Vinyl chloride	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 12:34	75-01-4	
m&p-Xylene	0.50	ug/m3	0.19	1	02/11/15 08:08	02/11/15 12:34	179601-23-1	
o-Xylene S <i>urrogates</i>	0.18	ug/m3	0.095	1	02/11/15 08:08	02/11/15 12:34	95-47-6	
Chlorobenzene-d5 (S)	104	%.		1	02/11/15 08:08	02/11/15 12:34	3114-55-4	

HVE 19 March 2 915



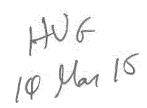
Project:

WEST LAKE LANDFILL

Pace Project No.: 60187573

Date: 02/25/2015 04:38 PM

Sample: WAA-02-RV-PS-20150204	Lab ID: 601	87573002	Collected: 02/04/1	5 13:29	Received: 02	2/06/15 09:45	Matrix: Air	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No:	Qual
TO17M VOC MS AIR Passive	Analytical Meti	nod: TO-17N	Preparation Metho	d: TO-1	7M			
cis-1,2-Dichloroethene	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 13:05	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 13:05	156-60-5	
Ethylbenzene	0.18	ug/m3	0.095	1	02/11/15 08:08	02/11/15 13:05	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 13:05	98-82-8	
Methyl-tert-butyl ether	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 13:05	1634-04-4	CH,L1
Tetrachloroethene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 13:05	127-18-4	
Trichloroethene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 13:05	79-01-6	
1,2,4-Trimethylbenzene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 13:05	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 13:05	5 108-67-8	
Vinyl chloride	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 13:05	75-01-4	
m&p-Xylene	0.48	ug/m3	0.19	1	02/11/15 08:08	02/11/15 13:05	179601-23-1	
o-Xylene Surrogates	0.17	ug/m3	0.095	1	02/11/15 08:08	02/11/15 13:05	95-47-6	
Chiorobenzene-d5 (S)	105	%.		1	02/11/15 08:08	02/11/15 13:05	3114-55-4	



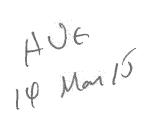


Project.

WEST LAKE LANDFILL

Pace Project No.:

Sample: WAA-03-RV-PS-20150204	Lab ID: 601	87573003	Collected: 02/04/1	5 13:50	Received: 02	2/06/15 09:45	Matrix: Air	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO17M VOC MS AIR Passive	Analytical Meti	nod: TO-17N	/ Preparation Metho	d: TO-1	7M			
cis-1,2-Dichloroethene	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 13:36	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 13:36	156-60-5	
Ethylbenzene	0.18	ug/m3	0.095	1	02/11/15 08:08	02/11/15 13:36	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 13:36	98-82-8	
Methyl-tert-butyl ether	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 13:36	1634-04-4	CH,L1
Tetrachloroethene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 13:36	127-18-4	
Trichloroethene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 13:36	79-01-6	
1,2,4-Trimethylbenzene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 13:36	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 13:36	108-67-8	
Vinyl chloride	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 13:36	75-01-4	
m&p-Xylene	0.47	ug/m3	0.19	1	02/11/15 08:08	02/11/15 13:36	179601-23-1	
o-Xylene <i>Surrogates</i>	0.17	ug/m3	0.095	1	02/11/15 08:08	02/11/15 13:36	95-47-6	
Chlorobenzene-d5 (S)	104	%.		1	02/11/15 08:08	02/11/15 13:36	3114-55-4	



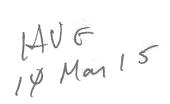


Project:

WEST LAKE LANDFILL

Pace Project No.:

Sample: WAA-04-RV-PS-20150204	Lab ID: 601	87573004	Collected: 02/04/1	5 13:57	Received: 02	//06/15 09:45	Matrix; Air	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO17M VOC MS AIR Passive	Analytical Met	hod: TO-17N	Preparation Metho	d: TO-1	7M			
cis-1,2-Dichloroethene	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 14:07	156-59-2	
rans-1,2-Dichloroethene	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 14:07	156-60-5	
Ethylbenzene	0.16	ug/m3	0.095	1	02/11/15 08:08	02/11/15 14:07	100-41-4	
sopropylbenzene (Cumene)	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 14:07	98-82-8	
Methyl-tert-butyl ether	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 14:07	1634-04-4	CH,L1
Tetrachloroethene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 14:07	127-18-4	
Frichloroethene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 14:07	79-01-6	
,2,4-Trimethylbenzene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 14:07	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 14:07	108-67-8	
/inyl chloride	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 14:07	75-01-4	
m&p-Xylene	0.41	ug/m3	0.19	1	02/11/15 08:08	02/11/15 14:07	179601-23-1	
o-Xylene Surrogates	0.15	ug/m3	0.095	1	02/11/15 08:08	02/11/15 14:07	95-47-6	
Chlorobenzene-d5 (S)	105	%.		1	02/11/15 08:08	02/11/15 14:07	3114-55-4	



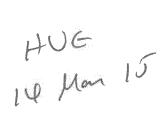


Project:

WEST LAKE LANDFILL

Pace Project No.: 60187573

Sample: WAA-05-RV-PS-20150204 Parameters	Lab ID: 60187573005		Collected: 02/04/15 13:37		Received: 02/06/15 09:45		Matrix: Air	
	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
O17M VOC MS AIR Passive	Analytical Met	hod: TO-17N	/ Preparation Metho	d: TO-1	7M			
sis-1,2-Dichloroethene	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 14:56	156-59-2	
rans-1,2-Dichloroethene	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 14:56	156-60-5	
Ethylbenzene	0.17	ug/m3	0.095	1	02/11/15 08:08	02/11/15 14:56	100-41-4	
sopropylbenzene (Cumene)	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 14:56	98-82-8	
Methyl-tert-butyl ether	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 14:56	1634-04-4	CH,L1
Tetrachloroethene	ND	ug/m3	0,24	1	02/11/15 08:08	02/11/15 14:56	127-18-4	
Frichloroethene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 14:56	79-01-6	
1,2,4-Trimethylbenzene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 14:56	95-63-6	
,3,5-Trimethylbenzene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 14:56	108-67-8	
/inyl chloride	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 14:56	75-01-4	
n&p-Xylene	0.44	ug/m3	0.19	1	02/11/15 08:08	02/11/15 14:56	179601-23-1	
o-Xylene S <i>urrogates</i>	0.16	ug/m3	0.095	1	02/11/15 08:08	02/11/15 14:56	95-47-6	
Chlorobenzene-d5 (S)	104	%.		1	02/11/15 08:08	02/11/15 14:56	3114-55-4	





Project:

WEST LAKE LANDFILL

Pace Project No.:

Date: 02/25/2015 04:38 PM

60187573

Sample: WAA-04-RV-DU-20150204 Parameters	Lab ID: 60187573006		Collected: 02/04/15 13:57		Received: 02/06/15 09:45		Matrix: Air	
	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO17M VOC MS AIR Passive	Analytical Met	hod: TO-17N	Preparation Metho	d: TO-1	7M			
cis-1,2-Dichloroethene	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 15:27	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 15:27	156-60-5	
Ethylbenzene	0.18	ug/m3	0.095	1	02/11/15 08:08	02/11/15 15:27	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 15:27	98-82-8	
Methyl-tert-butyl ether	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 15:27	1634-04-4	CH,L1
Tetrachloroethene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 15:27	127-18-4	
Trichloroethene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 15:27	79-01-6	
1,2,4-Trimethylbenzene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 15:27	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 15:27	108-67-8	
Vinyl chloride	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 15:27	75-01-4	
m&p-Xylene	0.47	ug/m3	0.19	1	02/11/15 08:08	02/11/15 15:27	179601-23-1	
o-Xylene Surrogates	0.17	ug/m3	0.095	1	02/11/15 08:08	02/11/15 15:27	95-47-6	
Chlorobenzene-d5 (S)	105	%.		1	02/11/15 08:08	02/11/15 15:27	3114-55-4	

HUE 19 Man/5

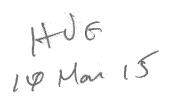


Project

WEST LAKE LANDFILL

Pace Project No.: 60187573

Sample: WAA-00-RV-TB-20150204	Lab ID: 60187573007		Collected: 02/04/15 14:14		Received: 02/06/15 09:45		Matrix: Air	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No	Qual
TO17M VOC MS AIR Passive	Analytical Meti	hod: TO-17N	1 Preparation Metho	d: TO-1	7M			
cis-1,2-Dichloroethene	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 12:03	156-59-2	
rans-1,2-Dichloroethene	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 12:03	156-60-5	
Ethylbenzene	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 12:03	100-41-4	
sopropylbenzene (Cumene)	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 12:03	98-82-8	
Methyl-tert-butyl ether	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 12:03	1634-04-4	CH,L1
Tetrachloroethene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 12:03	127-18-4	
Trichloroethene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 12:03	79-01-6	
1,2,4-Trimethylbenzene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 12:03	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	0.24	1	02/11/15 08:08	02/11/15 12:03	108-67-8	
Vinyl chloride	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 12:03	75-01-4	
n&p-Xylene	ND	ug/m3	0.19	1	02/11/15 08:08	02/11/15 12:03	179601-23-1	
o-Xylene Surrogates	ND	ug/m3	0.095	1	02/11/15 08:08	02/11/15 12:03	95-47-6	
Chlorobenzene-d5 (S)	100	%.		1	02/11/15 08:08	02/11/15 12:03	3114-55-4	





QUALITY CONTROL DATA

Project: WEST LAKE LANDFILL

Pace Project No.: 60187573

Date: 02/25/2015 04:38 PM

QC Batch: AIR/22479 Analysis Method: TO-17M

QC Batch Method: TO-17M Analysis Description: TO17 MSS AIR

Associated Lab Samples: 60187573001, 60187573002, 60187573003, 60187573004, 60187573005, 60187573006, 60187573007

METHOD BLANK: 1897770 Matrix: Air

Associated Lab Samples: 60187573001, 60187573002, 60187573003, 60187573004, 60187573005, 60187573006, 60187573007

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/m3	ND	0.24	02/11/15 10:43	
1,3,5-Trimethylbenzene	ug/m3	ND	0.24	02/11/15 10:43	
cis-1,2-Dichloroethene	ug/m3	ND	0.095	02/11/15 10:43	
Ethylbenzene	ug/m3	ND	0.095	02/11/15 10:43	
Isopropylbenzene (Cumene)	ug/m3	ND	0.24	02/11/15 10:43	
m&p-Xylene	ug/m3	ND	0.19	02/11/15 10:43	
Methyl-tert-butyl ether	ug/m3	ND	0.095	02/11/15 10:43	
o-Xylene	ug/m3	ND	0.095	02/11/15 10:43	
Tetrachloroethene	ug/m3	ND	0.24	02/11/15 10:43	
trans-1,2-Dichloroethene	ug/m3	ND	0.095	02/11/15 10:43	
Trichloroethene	ug/m3	ND	0.24	02/11/15 10:43	
Vinyl chloride	ug/m3	ND	0.095	02/11/15 10:43	
Chlorobenzene-d5 (S)	%.	97		02/11/15 10:43	

LABORATORY CONTROL SAMPLE:	1897771					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/m3	151	155	102	70-130	
1,3,5-Trimethylbenzene	ug/m3	151	150	99	70-130	
cis-1,2-Dichloroethene	ug/m3	102	109	107	70-130	
Ethylbenzene	ug/m3	113	115	102	70-130	
Isopropylbenzene (Cumene)	ug/m3	126	132	105	70-130	
m&p-Xylene	ug/m3	219	222	102	70-130	
Methyl-tert-butyl ether	ug/m3	80.9	114	141	70-130	CH,L0
o-Xylene	ug/m3	118	121	102	70-130	
Tetrachloroethene	ug/m3	178	184	103	70-130	
trans-1,2-Dichloroethene	ug/m3	102	109	107	70-130	
Trichloroethene	ug/m3	133	145	109	70-130	
Vinyl chloride	ug/m3	66	65.5	99	70-130	
Chlorobenzene-d5 (S)	%.			96		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665

QUALIFIERS

Project: WEST LAKE LANDFILL

Pace Project No.: 60187573

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

Date: 02/25/2015 04:38 PM

CH The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased

LO Analyte recovery in the laboratory control sample (LCS) was outside QC limits.

L1 Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results may be biased high.

REPORT OF LABORATORY ANALYSIS





QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: WEST LAKE LANDFILL

Pace Project No.: 60187573

Date: 02/25/2015 04:38 PM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60187573001	WAA-01-RV-PS-20150204	TO-17M	AIR/22479	 TO-17M	AIR/22480
60187573002	WAA-02-RV-PS-20150204	TO-17M	AIR/22479	TO-17M	AIR/22480
60187573003	WAA-03-RV-PS-20150204	TO-17M	AIR/22479	TO-17M	AIR/22480
60187573004	WAA-04-RV-PS-20150204	TO-17M	AIR/22479	TO-17M	AIR/22480
60187573005	WAA-05-RV-PS-20150204	TO-17M	AIR/22479	TO-17M	AIR/22480
60187573006	WAA-04-RV-DU-20150204	TO-17M	AIR/22479	TO-17M	AIR/22480
60187573007	WAA-00-RV-TB-20150204	TO-17M	AIR/22479	TO-17M	AIR/22480

REPORT OF LABORATORY ANALYSIS

Pace	Analytical*	Air Sample Con	ent Name: lition Upon Rec nent No.:	eipt	Document Revised: 26Do Page 1 of 1 Issuing Authority:	
		F-MN-A	-106-rev.09		Pace Minnesota Quality	
Air Sample Condition Clie Upon Receipt	nt Name:	5 %	Project #:	WO#	#:60187	573
	mmercial Pace	Other:	Client			
Custody Seal on Cooler/Bor	7 7		Intact?	Yes \square No	Uptional: Proj. Due Date:	Proj. Name:
Packing Material: Bubb				Other:	Toms	Blank rec: Yes No
Temp. (TO17 and TO13 sample	s only) ('c): 3,4	Corrected Temp (°C):	3.5	hermom. Used:	B88A912167504 B88A9132521491	□72337080 □80512447
Temp should be above freezing	=	er: +3.1		Date & Initials of Po	erson Examining Contents:	4
Type of Ice Received Dalue	:WetNone					
Chain of Custody Present?		Zyes □No	□N/A	1.	Comments:	
Chain of Custody Filled Out		ZYes No		2.		
Chain of Custody Relinquish		Ves No		3.		
Sampler Name and/or Signa		ZYes □No		3. 4.		
Samples Arrived within Hold		Zires □No		5.		accommendated the children of
		animana (1 a marina animana animana animana animana animana animana animana animana animana animana animana an		6.		
Short Hold Time Analysis (<						
Rush Turn Around Time Re	questear	And the second s		7.		
Sufficient Volume?		ZŶes □No		8.	The state of the s	
Correct Containers Used?	X.	ZÍÝes □No	'	9.		
-Pace Containers Used?		ZÎYes □No				
Containers Intact?	Lancence, management and account account and account account and account account and account account and account account and account and account account account and account account account account and account accou	ZYes □No	□N/A	10.		
Media: T()		Av. D.		11.		
Sample Labels Match COC?		✓ Yes □ No	□n/a	12.		
Samples Received:						
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Sample Number	Can ID	Sample Number		Can ID	Sample Number	Can ID
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	- AA					
Project Manager Review:	47W/			Date:	2.614	
Note: Whenever there is a discre- nold, incorrect preservative, out			s, a copy of thi		to the North Carolina DEHNR	Certification Office (i.e ou





CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section Require	A d Client Information:	Section Required		ct Info	rmation:					ction C	- Africa								Pa	ıge:	1	of	1
Compan	y: Tetra Tech EMI	Report To	STATE OF THE PARTY NAMED IN	NAN-MARKET NA	CONTROL SOURCE CONTROL	2Y423mmcc297fdisom				ention:	Emily Fisher		*****		_	x			L		***************************************		
Address	415 Oak	Copy To:							Сы	mpany Na	me: Tetra Tech						~~~	15,24,-9777				73.74. AT 10.75	
	Kansas City, MO 64106	1	-		727 7 7 7					dress:	415 Oak St, Kansa	e Cit	1 3.50	1 6/40e		BULAT		-		\$ - 3 Y			
Email To	Emily Fisher@tetratech.com	Purchase	Order	No.:	1111499	a ——	i vieno j			e Quota	TIV OWN ON NOISE	10 JUIL	Å" isir	J 04100		NPDES		GRO		ATER		DRINKING	WATER
Phone:	(816) 412-1755 Fax	Project Na			st Lake La			************************	Rof	erence: e Project	- A		,			UST	一	RCRA				OTHER	
	ed Due Date/7AT:	Project Nu			St Lake L	an runn			Mar	nagar:	Sherri Rosenstang	6	-		Sit	e Locati	on	М	0				
		1					-			a Profile#	970.8			***	100	STAT				- ///			
	Section D Valle Material		1	_	T	Materia de la companya del companya della companya				-	Special section (1)		R	equeste	d Anal	ysls Fil	tered	(Y/N)					
	Section D Valid Matrix (Required Client Information MATRIX	CODE	o (sAt)	E C		COLL	ECTED		6	뿡		NA											
	CRINKING WATER WATER WATER WATER WASTE WATER FRODUCT SOILSOLD OIL WIPE AIR	DW WT WW P SL OL WP AR OT	(see valid codes to (eff)	(G=GRAB C=COMP)	SAMPLIN DATE/	IG END TIME	SAMPLIN DATE/	S BND	3 TIME (MINUTE:	SAMPLING TEMPERATURE	TUBE SERIAL NUMBER		9							ine (Y/N)			
###	(A-Z, 0-9 / ,-) OTHER Sample IDs MUST BE UNIQUE TISSUE	rs	MATRIX CODE	SAMPLE TYPE	DATE	TIME	DATE	TME	TOTAL SAMPLING TIME (MINUTES)	AVERAGE BAMPI (°C)	2	Analysis Test	TO-17 Passive	i de la constante de la consta						Residual Chlorine	Pace	Project N	lo <i>J</i> Lab I.D.
1	WAA-01-RV-PS-20150204		AR		1/28/15	14:02	2/4/15	14:07	10085		781BN		х			11			11	\neg	-		
2	WAA-02-RV-PS-20150204		AR		1/28/15	13:21	2/4/15	13:29	10088	2.2	7845N		х		77				$\top \uparrow$			***************************************	
3	WAA-03-RV-PS-20150204		AR		1/28/15	13:39	2/4/15	13:50	10091	2.2	785BN	1	х						$\dagger \dagger$	1	***************************************	******	······································
4	WAA-04-RV-PS-20150204		AR		1/28/15	13:53	2/4/15	13:57	10084	22	786BN		x			11			11	1			
5	WAA-05-RV-PS-20150204		AR		1/28/15	13:29	2/4/15	13:37	10088	2.2	7876N		x		11				\Box				
6	WAA-04-RV-DU-20150204		AR		1/28/15	13:53	2/4/15	13:57	10084	2.2	7888N		х						11				
7	WAA-00-RV-TB-20150204		AR		1/28/15	13:15	2/4/15	14:14	NA.	NA	782BN		x			77			11	_			
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Tetra Tech, Inc. DATA VALIDATION REPORT LEVEL II

Site:

West Lake Landfill Site, Bridgeton, Missouri

Laboratory:	Pace Analytical Services, Inc. (Lenexa, Kansas)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	March 10, 2015
Sample Delivery Group (SDG):	60188142
Sample Numbers:	WAA-01-RV-PS-20150213, WAA-02-RV-PS-20150213, WAA-03-RV-PS-20150213, WAA-04-RV-PS-20150213, WAA-04-RV-DU-20150213,nWAA-05-RV-PS-20150213, and WAA-00-RV-TB-20150213
Matrix / Number of Samples:	5 Air Samples, 1 Field Duplicate Sample, and 1 Trip Blank
Methods Data Review" (9240.1-48) Packages from Subcontracted Labor in the applicable methods. The review was intended to identify apparent from the summary data parthat were found, and data qualifications.	atory Program National Functional Guidelines for Superfund Organic, June 2008. In addition, the Tetra Tech document "Review of Data ratories" (February 2002) was used along with other criteria specified problems and quality control (QC) deficiencies that were readily ekage. The following sections discuss any problems or deficiencies ions applied because of non-compliant QC. The data review was poratory QC information submitted with the project-specific data
	alidation criteria outlined in the above-referenced documents were de to the data accorded with those documents.
Hang N. Elli	10 March 2015
Certified by Harry Ellis, Chemist	Date

DATA VALIDATION QUALIFIERS

- U The analyte was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported sample quantitation limit, which is estimated.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

DATA ASSESSMENT

Sample delivery group (SDG) 60188142 included five (5) environmental air (adsorbent tube) samples and two (2) QC samples (a field duplicate and a trip blank). Samples were analyzed for selected volatile organic compounds via EPA Air Method TO-17. The following summarizes the data validation that was performed.

VOLATILE ORGANIC COMPOUND ANALYSIS

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 30 days from sample collection by tube to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. Satisfactory LCS and field duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

No analytes were detected in the laboratory (method) blank. The field blank yielded a low concentration of m+p-yxlenes. The other field samples yielded concentrations about 3 times as large, which may be, in part, the blank contamination. Therefore the sample results for m+p-xylenes were qualified as estimated and flagged "J".

IV. Laboratory Control Sample (LCS)

All LCS results were within QC limits. No qualifications were applied.

V. Surrogates

All surrogate recoveries were within QC limits. No qualifications were applied.

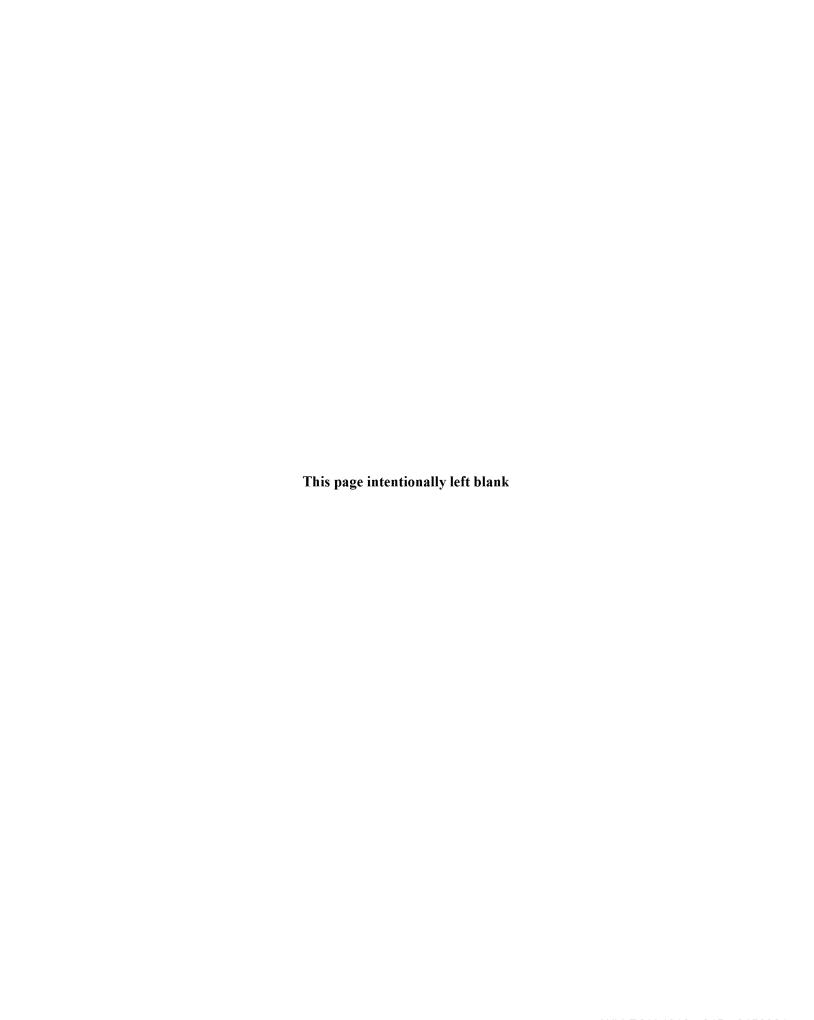
VI. Comments

No analytes were detected in the field samples.

VII. Overall Assessment of Data

Overall data quality is acceptable, with no qualifications added. All data are usable as reported for their intended purposes.

103J9025140058,000 3 SDG 60188142







March 03, 2015

Emily Fisher TETRA TECH EMI 415 Oak Kansas City, MO 64106

RE: Project: WEST LAKE LANDFILL Pace Project No.: 60188142

Dear Emily Fisher:

Enclosed are the analytical results for sample(s) received by the laboratory on February 17, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Shuri Bosenstangle

Sherri Rosenstangle sherri.rosenstangle@pacelabs.com Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665



CERTIFICATIONS

Project: WEST LAKE LANDFILL

Pace Project No.: 60188142

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414

A2LA Certification #: 2926.01 Alaska Certification #: UST-078 Alaska Certification #MN00064 Alabama Certification #40770 Arizona Certification #: AZ-0014 Arkansas Certification #: 88-0680 California Certification #: 01155CA Colorado Certification #Pace

Connecticut Certification #: PH-0256 EPA Region 8 Certification #: 8TMS-L Florida/NELAP Certification #: E87605

Guam Certification #:14-008r Georgia Certification #: 959 Georgia EPD #: Pace

Idaho Certification #: MN00064 Hawaii Certification #MN00064 Illinois Certification #: 200011 Indiana Certification#C-MN-01 Iowa Certification #: 368

Kansas Certification #: E-10167 Kentucky Dept of Envi. Protection - DW #90062 Kentucky Dept of Envi. Protection - WW #:90062

Louisiana DEQ Certification #: 3086 Louisiana DHH #: LA140001 Maine Certification #: 2013011 Maryland Certification #: 322

Michigan DEPH Certification #: 9909

Minnesota Certification #: 027-053-137 Mississippi Certification #: Pace Montana Certification #: MT0092 Nevada Certification #: MN_00064 Nebraska Certification #: Pace New Jersey Certification #: MN-002 New York Certification #: 11647 North Carolina Certification #: 530

North Carolina State Public Health #: 27700

North Dakota Certification #: R-036

Ohio EPA #: 4150 Ohio VAP Certification #: CL101 Oklahoma Certification #: 9507 Oregon Certification #: MN200001 Oregon Certification #: MN300001

Pennsylvania Certification #: 68-00563 Puerto Rico Certification Saipan (CNMI) #:MP0003 South Carolina #:74003001 Texas Certification #: T104704192 Tennessee Certification #: 02818 Utah Certification #: MN000642013-4 Virginia DGS Certification #: 251 Virginia/VELAP Certification #: Pace Washington Certification #: C486 West Virginia Certification #: 382

West Virginia DHHR #:9952C Wisconsin Certification #: 999407970

REPORT OF LABORATORY ANALYSIS

(913)599-5665



SAMPLE SUMMARY

Project: WEST LAKE LANDFILL

Pace Project No.: 60188142

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60188142001	WAA-01-RV-PS-20150213	Air	02/13/15 13:54	02/17/15 09:20
60188142002	WAA-02-RV-PS-20150213	Air	02/13/15 13:03	02/17/15 09:20
60188142003	WAA-03-RV-PS-20150213	Air	02/13/15 13:30	02/17/15 09:20
60188142004	WAA-04-RV-PS-20150213	Air	02/13/15 13:42	02/17/15 09:20
60188142005	WAA-05-RV-PS-20150213	Air	02/13/15 13:16	02/17/15 09:20
60188142006	WAA-01-RV-DU-20150213	Air	02/13/15 13:54	02/17/15 09:20
60188142007	WAA-00-RV-TB-20150213	Air	02/13/15 14:13	02/17/15 09:20

REPORT OF LABORATORY ANALYSIS





SAMPLE ANALYTE COUNT

Project: WEST LAKE LANDFILL

Pace Project No.: 60188142

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60188142001	WAA-01-RV-PS-20150213	TO-17M	RTP	13	PASI-M
60188142002	WAA-02-RV-PS-20150213	TO-17M	RTP	13	PASI-M
60188142003	WAA-03-RV-PS-20150213	TO-17M	RTP	13	PASI-M
60188142004	WAA-04-RV-PS-20150213	TO-17M	RTP	13	PASI-M
60188142005	WAA-05-RV-PS-20150213	TO-17M	RTP	13	PASI-M
60188142006	WAA-01-RV-DU-20150213	TO-17M	RTP	13	PASI-M
60188142007	WAA-00-RV-TB-20150213	TO-17M	RTP	13	PASI-M

REPORT OF LABORATORY ANALYSIS



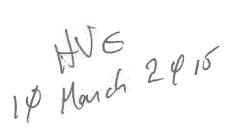
Project:

WEST LAKE LANDFILL

Pace Project No.:

60188142

Sample: WAA-01-RV-PS-20150213	Lab ID: 6018	8142001	Collected: 02/13/1	5 13:54	Received: 02	/17/15 09:20 N	latrix: Air	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO17M VOC MS AIR Passive	Analytical Meth	od: TO-17N	A Preparation Metho	d: TO-1	7M			
cis-1,2-Dichloroethene	ND	ug/m3	0.074	1	02/26/15 07:40	02/26/15 17:39	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	0.074	1	02/26/15 07:40	02/26/15 17:39	156-60-5	
Ethylbenzene	0.19	ug/m3	0.074	1	02/26/15 07:40	02/26/15 17:39	100-41-4	
sopropylbenzene (Cumene)	ND	ug/m3	0.19	1	02/26/15 07:40	02/26/15 17:39	98-82-8	
Methyl-tert-butyl ether	ND	ug/m3	0.074	1	02/26/15 07:40	02/26/15 17:39	1634-04-4	
Tetrachloroethene	ND	ug/m3	0.19	1	02/26/15 07:40	02/26/15 17:39	127-18-4	
Trichloroethene	ND	ug/m3	0.19	1	02/26/15 07:40	02/26/15 17:39	79-01-6	
1,2,4-Trimethylbenzene	ND	ug/m3	0.19	1	02/26/15 07:40	02/26/15 17:39	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	0.19	1	02/26/15 07:40	02/26/15 17:39	108-67-8	
Vinyl chloride	ND	ug/m3	0.074	1	02/26/15 07:40	02/26/15 17:39	75-01-4	
m&p-Xylene	0.51	ug/m3	0.15	1	02/26/15 07:40	02/26/15 17:39	179601-23-1	
o-Xylene Surrogates	0.18	ug/m3	0.074	1	02/26/15 07:40	02/26/15 17:39	95-47-6	
Chlorobenzene-d5 (S)	117	%.		1	02/26/15 07:40	02/26/15 17:39	3114-55-4	





Project:

WEST LAKE LANDFILL

Pace Project No.:

60188142

Sample: WAA-02-RV-PS-20150213	Lab ID: 6018	3142002	Collected: 02/13/1	5 13:03	Received: 02	2/17/15 09:20 M	∕latrix: Air	·
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO17M VOC MS AIR Passive	Analytical Metho	od: TO-17N	/ Preparation Metho	d: TO-1	7M			· · · · · · · · · · · · · · · · · · ·
cis-1,2-Dichloroethene	ND	ug/m3	0.074	1	02/26/15 07:40	02/26/15 18:10	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	0.074	1	02/26/15 07:40			
Ethylbenzene	0.19	ug/m3	0.074	1	02/26/15 07:40	02/26/15 18:10		
Isopropylbenzene (Cumene)	ND	ug/m3	0.19	1		02/26/15 18:10		
Methyl-tert-butyl ether	ND	ug/m3	0.074	1		02/26/15 18:10		
Tetrachloroethene	ND	ug/m3	0.19	1		02/26/15 18:10		
Trichloroethene	0.33	ug/m3	0.19	1		02/26/15 18:10		
1,2,4-Trimethylbenzene	ND	ug/m3	0.19	1		02/26/15 18:10		
1.3,5-Trimethylbenzene	ND	ug/m3	0.19	1		02/26/15 18:10		
Vinyl chloride	ND	ug/m3	0.074	1		02/26/15 18:10	· -	
m&p-Xylene	0.49 🝮	ug/m3	0.15	1		02/26/15 18:10		
o-Xylene S <i>urrogates</i>	0.18	ug/m3	0.074	1		02/26/15 18:10		
Chlorobenzene-d5 (S)	115	%.		1	02/26/15 07:40	02/26/15 18:10	3114-55-4	

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Project:

WEST LAKE LANDFILL

Pace Project No.: 60188142

Sample: WAA-03-RV-PS-20150213	Lab ID: 6018	38142003	Collected: 02/13/1	5 13:30	Received: 02	2/17/15 09:20	Matrix: Air	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO17M VOC MS AIR Passive	Analytical Meth	od: TO-17	M Preparation Metho	d: TO-1	7M			
cis-1,2-Dichloroethene	ND	ug/m3	0.074	1	02/26/15 07:40	02/26/15 18:41	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	0.074	1	02/26/15 07:40	02/26/15 18:41		
Ethylbenzene	0.20	ug/m3	0.074	1	02/26/15 07:40	02/26/15 18:41	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/m3	0.19	1	02/26/15 07:40	02/26/15 18:41	98-82-8	
Methyl-tert-butyl ether	ND	ug/m3	0.074	1	02/26/15 07:40	02/26/15 18:41	1634-04-4	
Tetrachloroethene	ND	ug/m3	0.19	1	02/26/15 07:40	02/26/15 18:41	127-18-4	
Trichloroethene	ND	ug/m3	0.19	1	02/26/15 07:40	02/26/15 18:41	79-01-6	
1,2,4-Trimethylbenzene	ND	ug/m3	0.19	1	02/26/15 07:40	02/26/15 18:41	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	0.19	1	02/26/15 07:40	02/26/15 18:41	108-67-8	
Vinyl chloride	ND	ug/m3	0.074	1	02/26/15 07:40	02/26/15 18:41	75-01-4	
m&p-Xylene	0.52 🏅	ug/m3	0.15	1	02/26/15 07:40	02/26/15 18:41	179601-23-1	
o-Xylene S <i>urrogates</i>	0.19	ug/m3	0.074	1		02/26/15 18:41		
Chlorobenzene-d5 (S)	115	%.		1	02/26/15 07:40	02/26/15 18:41	3114-55-4	

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REPORT OF LABORATORY ANALYSIS



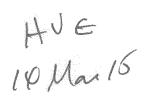
Project:

WEST LAKE LANDFILL

Pace Project No.:

60188142

Sample: WAA-04-RV-PS-20150213	Lab ID: 6018	8142004	Collected: 02/13/1	15 13:42	Received: 0	2/17/15 09:20	Matrix: Air	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO17M VOC MS AIR Passive	Analytical Meth	od: TO-17N	Preparation Metho	od: TO-1	7M			
cis-1.2-Dichloroethene	ND	ug/m3	0.074	1	02/26/15 07:40	02/26/15 19:1:	2 450 50 0	
rans-1,2-Dichloroethene	ND	ug/m3	0.074	1	02/26/15 07:40			
Ethylbenzene	0.19	ug/m3	0.074	1	02/26/15 07:40			
sopropylbenzene (Cumene)	ND	ug/m3	0.19	1	02/26/15 07:40			
Methyl-tert-butyl ether	ND	ug/m3	0.074	1		02/26/15 19:1: 02/26/15 19:1:		
letrachloroethene	ND	ug/m3	0.19	1				
Frichloroethene	ND	ug/m3	0.19	1		02/26/15 19:12		
,2,4-Trimethylbenzene	ND	ug/m3	0.19	1	02/26/15 07:40			
,3,5-Trimethylbenzene	ND	ug/m3	0.19	1	02/26/15 07:40			
/inyl chloride	ND	ug/m3		1	02/26/15 07:40			
n&p-Xylene	0.47	ug/m3	0.074	1	02/26/15 07:40			
-Xylene	0.17	•	0.15	1	02/26/15 07:40			
Surrogates	0.17	ug/m3	0.074	1	02/26/15 07:40	02/26/15 19:12	95-47-6	
Chiorobenzene-d5 (S)	112	% ₊		1	02/26/15 07:40	02/26/15 19:12	3114-55-4	





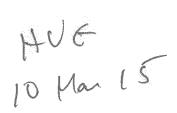
Project:

WEST LAKE LANDFILL

Pace Project No.:

60188142

Sample: WAA-05-RV-PS-20150213	Lab ID: 601	88142005	Collected: 02	2/13/15	13:16	Received: 0	2/17/15 09:20	Matrix: Air	
Parameters	Results	Units	Report Li	mit	DF	Prepared	Analyzed	CAS No.	Qual
TO17M VOC MS AIR Passive	Analytical Meti	nod: TO-17N	A Preparation I	Methoc	l: TO-1	7M			
cis-1,2-Dichloroethene	ND	ug/m3	0	074	1	02/26/15 07:40	02/27/15 07:29	150 50 0	
trans-1,2-Dichloroethene	ND	ug/m3		074	1	02/26/15 07:40			
Ethylbenzene	0.26	ug/m3		074	1	02/26/15 07:40			
sopropylbenzene (Cumene)	ND	ug/m3		0.19	1		02/27/15 07:29		
Methyl-tert-butyl ether	ND	ug/m3		074	1		02/27/15 07:29		
[etrachloroethene	ND	ug/m3	(0.19	1		02/27/15 07:29		
Trichloroethene	ND	ug/m3	Ċ	0.19	1		02/27/15 07:29		
,2,4-Trimethylbenzene	ND	ug/m3	Ċ).19	1		02/27/15 07:29		
,3,5-Trimethylbenzene	ND	ug/m3	Ċ).19	1		02/27/15 07:29		
/inyl chloride	ND	ug/m3	0.0	074	1		02/27/15 07:29		
n&p-Xylene	0.66 ブ	ug/m3	C).15	1		02/27/15 07:29		
-Xylene Surrogates	0.24	ug/m3	0.0	074	1		02/27/15 07:29		
Chlorobenzene-d5 (S)	105	%.			1	02/26/15 07:40	02/27/15 07:29	3114-55-4	





Project:

WEST LAKE LANDFILL

Pace Project No.: 60188142

Sample: WAA-01-RV-DU-20150213	Lab ID: 6018	38142006	Collected: 02/13/	15 13:54	Received: 02	:/17/15 09:20 N	fatrix: Air	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO17M VOC MS AIR Passive	Analytical Meth	od: TO-17N	Preparation Metho	od: TO-1	7M			
cis-1,2-Dichloroethene	ND	ug/m3	0.088	1.19	02/27/15 08:34	02/27/15 15:13	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	880.0	1.19	02/27/15 08:34	02/27/15 15:13	156-60-5	
Ethylbenzene	0.21	ug/m3	0.088	1.19	02/27/15 08:34	02/27/15 15:13	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/m3	0.22	1.19	02/27/15 08:34	02/27/15 15:13	98-82-8	
Methyl-tert-butyl ether	ND	ug/m3	0.088	1.19	02/27/15 08:34	02/27/15 15:13	1634-04-4	
Tetrachloroethene	ND	ug/m3	0.22	1.19	02/27/15 08:34	02/27/15 15:13	127-18-4	
Trichloroethene	ND	ug/m3	0.22	1.19	02/27/15 08:34	02/27/15 15:13	79-01-6	
1,2,4-Trimethylbenzene	ND	ug/m3	0.22	1.19	02/27/15 08:34	02/27/15 15:13	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	0.22	1.19	02/27/15 08:34	02/27/15 15:13	108-67-8	
Vinyl chloride	ND	ug/m3	0.088	1.19	02/27/15 08:34	02/27/15 15:13	75-01-4	
m&p-Xylene	0.49 了	ug/m3	0.18	1.19	02/27/15 08:34	02/27/15 15:13	179601-23-1	
o-Xylene S <i>urrogates</i>	0.18	ug/m3	0.088	1.19		02/27/15 15:13		
Chlorobenzene-d5 (S)	104	%.		1.19	02/27/15 08:34	02/27/15 15:13	3114-55-4	

HUE 19 Man 15



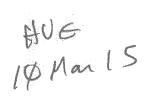
Project:

WEST LAKE LANDFILL

Pace Project No.:

60188142

Sample: WAA-00-RV-TB-20150213	Lab ID: 601	88142007	Collected: 02/13/1	15 14:13	Received: 02	/17/15 09:20	Matrix: Air	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO17M VOC MS AIR Passive	Analytical Met	hod: TO-17N	1 Preparation Metho	od: TO-1	7M			
cis-1,2-Dichloroethene	ND	ug/m3	0.074	1	02/26/15 07:40	02/26/15 15:35	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	0.074	1	02/26/15 07:40	02/26/15 15:35	156-60-5	
Ethylbenzene	ND	ug/m3	0.074	1	02/26/15 07:40	02/26/15 15:35	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/m3	0.19	1	02/26/15 07:40	02/26/15 15:35	98-82-8	
Methyl-tert-butyl ether	ND	ug/m3	0.074	1	02/26/15 07:40	02/26/15 15:35	1634-04-4	
Tetrachloroethene	ND	ug/m3	0.19	1	02/26/15 07:40	02/26/15 15:35	127-18-4	
Trichloroethene	ND	ug/m3	0.19	1	02/26/15 07:40	02/26/15 15:35	79-01-6	
1,2,4-Trimethylbenzene	ND	ug/m3	0.19	1	02/26/15 07:40	02/26/15 15:35	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	0.19	1	02/26/15 07:40	02/26/15 15:35	108-67-8	
Vinyl chloride	ND	ug/m3	0.074	1	02/26/15 07:40	02/26/15 15:35	75-01-4	
m&p-Xylene	0.17	ug/m3	0.15	1	02/26/15 07:40	02/26/15 15:35	179601-23-1	
o-Xylene Surrogates	ND	ug/m3	0.074	1	02/26/15 07:40	02/26/15 15:35	95-47-6	
Chlorobenzene-d5 (S)	110	%.		1	02/26/15 07:40	02/26/15 15:35	3114-55-4	



REPORT OF LABORATORY ANALYSIS



QUALITY CONTROL DATA

Project: WEST LAKE LANDFILL

Pace Project No.: 60188142

Date: 03/03/2015 08:16 AM

QC Batch: AIR/22599 Analysis Method: TO-17M

QC Batch Method: TO-17M Analysis Description: TO17 MSS AIR

Associated Lab Samples: 60188142001, 60188142002, 60188142003, 60188142004, 60188142005, 60188142007

METHOD BLANK: 1908195 Matrix: Air

Associated Lab Samples: 60188142001, 60188142002, 60188142003, 60188142004, 60188142005, 60188142007

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/m3	ND	0.19	02/26/15 14:46	
1,3,5-Trimethylbenzene	ug/m3	ND	0.19	02/26/15 14:46	
cis-1,2-Dichloroethene	ug/m3	ND	0.074	02/26/15 14:46	
Ethylbenzene	ug/m3	ND	0.074	02/26/15 14:46	
Isopropylbenzene (Cumene)	ug/m3	ND	0.19	02/26/15 14:46	
m&p-Xylene	ug/m3	ND	0.15	02/26/15 14:46	
Methyl-tert-butyl ether	ug/m3	ND	0.074	02/26/15 14:46	
o-Xylene	ug/m3	ND	0.074	02/26/15 14:46	
Tetrachloroethene	ug/m3	ND	0.19	02/26/15 14:46	
trans-1,2-Dichloroethene	ug/m3	ND	0.074	02/26/15 14:46	
Trichloroethene	ug/m3	ND	0.19	02/26/15 14:46	
Vinyl chloride	ug/m3	ND	0.074	02/26/15 14:46	
Chlorobenzene-d5 (S)	%.	102		02/26/15 14:46	

		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/m3	.12	.12J	104	70-130	
1,3,5-Trimethylbenzene	ug/m3	.12	.12J	100	70-130	
cis-1,2-Dichloroethene	ug/m3	.08	0.089	112	70-130	
Ethylbenzene	ug/m3	.089	0.089	100	70-130	
Isopropylbenzene (Cumene)	ug/m3	.099	.1J	104	70-130	
m&p-Xylene	ug/m3	.086	.089J	104	70-130	
Methyl-tert-butyl ether	ug/m3	.063	.048J	76	70-130	
o-Xylene	ug/m3	.092	0.096	104	70-130	
Tetrachloroethene	ug/m3	.14	.15J	107	70-130	
trans-1,2-Dichloroethene	ug/m3	.08	0.087	109	70-130	
Trichloroethene	ug/m3	.1	.11J	110	70-130	
Vinyl chloride	ug/m3	.052	.056J	109	70-130	
Chlorobenzene-d5 (S)	%.			105		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS



QUALITY CONTROL DATA

Project: WEST LAKE LANDFILL

Pace Project No.: 60188142

Date: 03/03/2015 08:16 AM

QC Batch: AIR/22603 Analysis Method: TO-17M

QC Batch Method: TO-17M Analysis Description: TO17 MSS AIR

Associated Lab Samples: 60188142006

METHOD BLANK: 1908303 Matrix: Air

Associated Lab Samples: 60188142006

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/m3	ND	0.24	02/27/15 11:02	
1,3,5-Trimethylbenzene	ug/m3	ND	0.24	02/27/15 11:02	
cis-1,2-Dichloroethene	ug/m3	ND	0.096	02/27/15 11:02	
Ethylbenzene	ug/m3	ND	0.096	02/27/15 11:02	
Isopropylbenzene (Cumene)	ug/m3	ND	0.24	02/27/15 11:02	
m&p-Xylene	ug/m3	ND	0.19	02/27/15 11:02	
Methyl-tert-butyl ether	ug/m3	ND	0.096	02/27/15 11:02	
o-Xylene	ug/m3	ND	0.096	02/27/15 11:02	
Tetrachloroethene	ug/m3	ND	0.24	02/27/15 11:02	
trans-1,2-Dichloroethene	ug/m3	ND	0.096	02/27/15 11:02	
Trichloroethene	ug/m3	ND	0.24	02/27/15 11:02	
Vinyl chloride	ug/m3	ND	0.096	02/27/15 11:02	
Chlorobenzene-d5 (S)	%.	99		02/27/15 11:02	

LABORATORY CONTROL SAMPLE	: 1908304					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/m3	.15	.16J	103	70-130	
1,3,5-Trimethylbenzene	ug/m3	.15	.15J	101	70-130	
cis-1,2-Dichloroethene	ug/m3	.1	0.11	106	70-130	
Ethylbenzene	ug/m3	.11	0.12	106	70-130	
Isopropylbenzene (Cumene)	ug/m3	.13	.14J	108	70-130	
m&p-Xylene	ug/m3	.22	0.24	106	70-130	
Methyl-tert-butyl ether	ug/m3	.082	.091J	111	70-130	
o-Xylene	ug/m3	.12	0.12	104	70-130	
Tetrachloroethene	ug/m3	.18	.19J	106	70-130	
trans-1,2-Dichloroethene	ug/m3	.1	0.11	108	70-130	
Trichloroethene	ug/m3	.14	.14J	104	70-130	
Vinyl chloride	ug/m3	.067	.078J	116	70-130	
Chlorobenzene-d5 (S)	%.			99		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

(913)599-5665



QUALIFIERS

Project: WEST LAKE LANDFILL

Pace Project No.: 60188142

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

Date: 03/03/2015 08:16 AM

PASI-M Pace Analytical Services - Minneapolis

REPORT OF LABORATORY ANALYSIS





QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: WEST LAKE LANDFILL

Pace Project No.: 60188142

Date: 03/03/2015 08:16 AM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60188142001	WAA-01-RV-PS-20150213	TO-17M	AIR/22599	TO-17M	AIR/22600
60188142002	WAA-02-RV-PS-20150213	TO-17M	AIR/22599	TO-17M	AIR/22600
60188142003	WAA-03-RV-PS-20150213	TO-17M	AIR/22599	TO-17M	AIR/22600
60188142004	WAA-04-RV-PS-20150213	TO-17M	AIR/22599	TO-17M	AIR/22600
60188142005	WAA-05-RV-PS-20150213	TO-17M	AIR/22599	TO-17M	AIR/22600
60188142006	WAA-01-RV-DU-20150213	TO-17M	AIR/22603	TO-17M	AIR/22604
60188142007	WAA-00-RV-TB-20150213	TO-17M	AIR/22599	TO-17M	AIR/22600

REPORT OF LABORATORY ANALYSIS

Pac	e Analytical *	Documer Air Sample Condit Docume F-MN-A-1	ion Upon Receipt ent No.:	Document Revised: 26Dec2013 Page 1 of 1 Issuing Authority: Pace Minnesota Quality Office					
Upon Receipt Courier:	the state of the s	□usps □c	Project#: WO#	: 6018814	42				
Tracking Number: 7	mmercial □Pace 729 i959 05	Other: -o- 	6018814	2					
Custody Seal on Cooler/Bo	<i>*</i>			Optional: Proj. Due Date:	Proj. Name:				
		□No Seals in	_	holosopania iliini kanaa iliini					
Packing Material: Bubl	. /-	_			Blank rec: Pes No				
Temp. (TO17 and TO13 sample	-	Corrected Temp (°C):	Z.G Thermom. Used:	☐B88A912167504 ☑B88A9132521491	72337080 80512447				
Temp should be above freezin		tor: <u>Yue</u>	Date & Initials of	Person Examining Contents:	9221715				
Type of Ice Received Blue	≧ ∐Wet ∐None								
		panel panel		Comments:					
Chain of Custody Present? Chain of Custody Filled Out	3	ZYes □No ZYes □No							
Chain of Custody Relinquish	***		□N/A 2.						
Sampler Name and/or Signa		∠ZYes □No □Yes □No	□N/A 3.						
Samples Arrived within Hold			□N/A 4. □N/A 5.		ministra den von del del nel novo consista del del ministra del necessita del necessità del necessità del del consistente del necessita del ne				
Short Hold Time Analysis (<		□Yes ☑No							
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Sufficient Volume?		-dYes □No	□N/A 8.						
Correct Containers Used?		, ∠Yes □No	□N/A 9.						
-Pace Containers Used?		ZYes □No			±				
Containers Intact?		PYes No	□N/A 10.						
Media: TDT	passive	, les I ivo	11.	CONCERNATION OF THE PROPERTY O	and the second s				
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CLIENT NOTIFICATION/RESC	LUTION		**************************************	Field Data Required?	□Ves □No				
•			Date/Time:	Treat Data Required:					
Comments/Resolution	on:		Sample Control of the						
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Project Manager Review:	754/		Ph	217.16					
Note: Whenever there is a discre	pancy affecting North Care	olina compliance samples, a	copy of this form will be sen	t to the North Carolina DEHNR	Certification Office Lie out o				
nold, incorrect preservative, out o	f temp, incorrect contains	ers)			a j no out t				

Page 16 of 17





CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section Require	n A ad Client Information;		Project I	nformation:					ion C se Inform	ation.	2 10 000								Page:	1	of	1
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	Kansas City, MO 64106		***************************************	POLICE CONTROL	***************************************	······································		Addre	988:	415 Oak St, Kansa	s Cit	y, M	O 64106	TI	IPDES	Γ	GR	DUND	WATE	R [DRINKING	WATER
Email T	Emily.Fisher@tetratech.com	Purchase	Order N	111149	9			Pace (Refere				-		1 - (JST	Г	- RCF	A5		Г	OTHER	
Phone:	(816) 412-1755 Fax:	Project Na	ате: \	West Lake L	andfill			Pace	roject	Sherri Rosenstangl	e		4	Site	Location	on		***************************************	Ī			
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Memoria	Required Client Information MATRIX DRINKING WATER	CODE DW W/	a) c) s	COMPO	COLL	ECTED		<u> </u>	Ę		T X	_			44				W			
	MATER WASTE WATER PRODUCT SOILSOILS OIL AR AR	WW P SL OL WP AR OT	bliav eas)	Garage Date	NG BND MIME	SAMPLING DATE/T	S END IME	SAMPLING TIME (MINUTES)	AVERAGE SAMPLING TEMPERATURE (°C)	TUBE SERIAL NUMBER	Test	Ve							orine (Y/N)			
TEM#	(A-Z, 0-9 / ,-) OTHER Sample IDs MUST BE UNIQUE TISSUE	TS	MATRIX CODE	SAMPLE TYPE	TIME	DATE	TIME	TOTAL SAMPLIF	AVERAGE SAM (°C)		& Analysis	TO-17 Passive							Residual Chlorine (Y/N)	Pace	Project N	o./ Lab I.D.
1	WAA-01-RV-PS-20150213		AR	2/4/15	14:07	2/13/15	13:54	12947	1.7	790BN		X										
2	WAA-02-RV-PS-20150213		AR	2/4/15	13:29	2/13/15	13:03	12934	1.7	791BN		X										
3	WAA-03-RV-PS-20150213		AR	2/4/15	13:50	2/13/15	13:30	12940	1.7	793BN		Lx				\perp			Ш			
4	WAA-04-RV-PS-20150213		AR	2/4/15	13:57	2/13/15	13:42	12945	1.7	794BN		<u>x</u>		111	11				11			
- 5	WAA-05-RV-PS-20150213		AR	2/4/15	13:37	2/13/15	13:16	12939	1.7	795BN	1	X					111		44		-	
8	WAA-01-RV-DU-20150213		AR	2/4/15	14:07	2/13/15	13:54	12947	1.7	798BN		<u> </u> x	\Box		44	1	44		44			
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Tetra Tech, Inc. DATA VALIDATION REPORT LEVEL II

Site:

West Lake Landfill Site, Bridgeton, Missouri

Laboratory:	ALS Environmental (Simi Valley, California)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	March 13, 2015
Sample Delivery Group (SDG):	P1500074
Sample Numbers:	WAA-01-RH-PS-20150105, WAA-02-RH-PS-20150105, WAA-03-RH-PS-20150105, WAA-04-RH-PS-20150105, WAA-04-RH-DU-20150105, WAA-05-RH-PS-20150105, and WAA-00-RH-TB-20150105
Matrix / Number of Samples:	5 Air Samples, 1 Field Duplicate Sample, and 1 Trip Blank
documents entitled "Contract Labor Methods Data Review" (9240.1-48) Packages from Subcontracted Labor in the applicable methods. The review was intended to identify apparent from the summary data parthat were found, and data qualifications.	o the U.S. Environmental Protection Agency (EPA) Region 7 atory Program National Functional Guidelines for Superfund Organic, June 2008. In addition, the Tetra Tech document "Review of Data ratories" (February 2002) was used along with other criteria specified problems and quality control (QC) deficiencies that were readily ekage. The following sections discuss any problems or deficiencies ions applied because of non-compliant QC. The data review was boratory QC information submitted with the project-specific data
I, Harry Ellis, certify that all data va	alidation criteria outlined in the above-referenced documents were de to the data accorded with those documents.
Hang N. Elli	13 March 2015
Certified by Harry Ellis, Chemist	Date

103I9025140058.000 1 SDG P1500074

DATA VALIDATION QUALIFIERS

- U The analyte was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported sample quantitation limit, which is estimated.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

103I9025140058.000 2 SDG P1500074

DATA ASSESSMENT

Sample delivery group (SDG) P1500074 included five (5) environmental air (RadielloTM adsorbent tube) samples and two (2) QC samples (a field duplicate and a trip blank). Samples were analyzed for hydrogen sulfide via the laboratory's implementation of the manufacturer's method. The following summarizes the data validation that was performed.

VOLATILE ORGANIC COMPOUND ANALYSIS

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the accepted holding time of 30 days from sample collection by tube to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. Satisfactory LCS and field duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

No analytes were detected in the laboratory (method) and field blanks. No qualifications were applied.

IV. Laboratory Control Sample (LCS)

All results for the duplicate LCS were within QC limits.

V. Surrogates

Surrogates are not used in this analysis.

VI. Comments

All detected results in the field samples were less than the sample reporting limits, which correspond to the lowest calibration standard. The laboratory correctly qualified these results as estimated and flagged them "J". All detected results, including the field duplicate pair, were quite similar.

VII. Overall Assessment of Data

Overall data quality is acceptable, with no qualifications added. All data are usable as reported for their intended purposes.

103J9025140058,000 3 SDG P1500074

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2655 Park Center Dr., Suite A Simi Valley, CA 93065 T: +1 805 526 7161

F: +1 805 526 7270 www.alsglobal.com

LABORATORY REPORT

January 24, 2015

Rob Monnig Tetra Tech, Incorporated 415 Oak Street Kansas City, MO 64106

RE: West Lake Landfill / 103X9025140058

Dear Rob:

Enclosed are the results of the samples submitted to our laboratory on January 8, 2015. For your reference, these analyses have been assigned our service request number P1500074.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions inlessed call mo at (805) 526 7161

By Sue Anderson at 9:18 am, Jan 24, 2015

Sue Anderson Project Manager



2655 Park Center Dr., Suite A Simi Valley, CA 93065 T: +1 805 526 7161 F: +1 805 526 7270 www.alsglobal.com

Client: Tetra Tech, Incorporated Service Reguest No: P1500074

Project: West Lake Landfill / 103X9025140058

CASE NARRATIVE

The samples were received intact under chain of custody on January 8, 2015 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Hydrogen Sulfide in Air (H₂S) Analysis

The samples were prepared in accordance with CAS AQL 110 for hydrogen sulfide in air and analyzed by colorimetric method using a spectrophotometer. This method is not included on the laboratory's NELAP, DoD-ELAP, or AIHA-LAP scope of accreditation.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution")without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.



2655 Park Center Dr., Suite A Simi Valley, CA 93065

T: +1 805 526 7161 F: +1 805 526 7270 www.alsglobal.com

ALS Environmental - Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	838341
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	CA200007
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413- 14-5
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA01627201 4-4
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

RIGHT SOLUTIONS | RIGHT PARTNER

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: Tetra Tech, Incorporated Service Request: P1500074

Project ID: West Lake Landfill / 103X9025140058

P1500074-005

P1500074-006

P1500074-007

Air

Air

Air

1/5/2015

1/5/2015

1/5/2015

Date Received: 1/8/2015 Time Received: 13:58

WAA-04-RH-DU-20150105

WAA-00-RH-TB-20150105

CAS AQL 110 - H2S Air Date Time Collected Collected Client Sample ID Lab Code Matrix WAA-01-RH-PS-20150105 P1500074-001 Air 1/5/2015 14:06 X X WAA-02-RH-PS-20150105 P1500074-002 Air 1/5/2015 13:09 WAA-03-RH-PS-20150105 P1500074-003 1/5/2015 13:30 Х Air X WAA-04-RH-PS-20150105 P1500074-004 Air 1/5/2015 13:43 WAA-05-RH-PS-20150105 X

13:19

13:43

14:15

X

X

Radiello - Chain of Custody Record & Analytical Service Request



2655 Park Center Drive, Suite A Simi Valley, California 93065 Phone (805) 526-7161

Fax (805) 526-7270				1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard						+		
				1044(10070) 20	ay (1070) 0 Day (00	70) + Day (3070) 3	ALS Contact:	Day-Standard	<u> </u>		·	
Company Name & Address (Reporting Information)				Project Name			Sue Anderson					
Tetra Tech 415 Oak Street,				West Lake Landfill			Analysis:					
Kansas City, MO 64106				Project Number 103X9025140058			(e.g. NO ₂ , SO ₂ , O ₃ , VOCs, Aldehyde, Ammonia)					
Project Manager				P.O. # / Credit Card	d / Billing Information							
Rob Monnig (816-412-1775) / Dave Kinroth (314-517-6798)				PO 1111500			9			Comments		
Phone Fax			Attn: Emily Fisher			 						
816-412-1775 816-410-1748				416 Oak Street, Kansas City, MO 64106			S					
Email Address for Result Reporting	,						Je	parameter	W			
emily.fisher@tetratech.com		***************************************	1972-1972-1970-1971-190-190-190-190-190-190-190-190-190-19	emily.fisher@tetratech.com			õ	400	6000 mm m m m m m m m m m m m m m m m m	1		
Client Sample ID	Laboratory ID Number	Date/Time Start	Date/Time End	Total Sampling Time (minutes)	Sampling Temp 25°C assumed if not specified	Radiello ID Sticker Number	Hydrogen Sulfide					
WAA-01-RH-PS-20150105	0	12/27/14 @ 11:17	1/5/15 @ 14:06	13129	-0.6	674GS	Х				oberlande de de de de de de de de de de de de d	
© ¶VAA-02-RH-PS-20150105 ⇒	0	12/27/14 @ 11:19	1/5/15 @ 13:09	13070	-0.6	675GS	X				oldeldelsen, broke kliekte zum er er er er prong georp zu gegentzig geste gegentzigen zu gesche der geste der	
WAA-03-RH-PS-20150105	O	12/27/14 @ 11:40	1/5/15 @ 13:30	13070	-0,6	676GS	х			тите большений в несето не не не не не не не не не не не не не	and the analysis and considerant free selected free selected free selected and selected selec	
WAA-04-RH-PS-20150105	Ø	12/27/14 @ 11:30	1/5/15 @ 13:43	13093	-0.6	677GS	×			оружування в поста по по по по по по по по по по по по по		
WAA-05-RH-PS-20150105	0	12/27/14 @ 11:33	1/5/15 @ 13:19	13066	-0.6	678GS	X					
WAA-04-RH-DU-20150105	9	12/27/14 @ 11:30	1/5/15 @ 13:43	13093	-0.6	679GS	X					
WAA-00-RH-TB-20150105	10	12/27/14 @ 10:42	1/5/15 @ 14:15	NA	NA	680GS	X			6600m 4000 kin hadraglarararararararararararararararararar		
Report Tile Tier I - (Results/Default if not specif Tier II (Results + QC)	er Levels - plea	ase select of Tier III (Data Tier V (clien	a Validation P	ackage) 10% Surcha	arge	EDD required Ye Type:	5	Chain of Custon INTACT BRO	dy Seal: (Circle)	Project Requiremen	ts (MRLs, QAPP)	
Reliquished by: (Signature) - A Date: 1-7-15			Received by: (Signature)				Date:	Time:				
Reliquished by: (Signature) Date:			Time:	Receivedia	y: (Signature)		Date//15	Time:350				
Reliquished by: (Signature)			Time:	Received by: (Signature)			Date:		Cooler / Blank Temperature	³°c		

WLLFOIA4312 - 015 - 0156407

ALS Environmental Sample Acceptance Check Form

	Tetra Tech, In					Work order:	P1500074				
-	West Lake Landfill / 103X9025140058										
Sample(s) received on: 1/8/15 Date opened: 1/8/15 by:								ADAVID			
<u>Note:</u> This form is used for <u>all</u> samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absenceand not as an indication of											
compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP. Yes No N/A											
1	Were sample	containers properly n	narked with cli	ent sample ID	?					-	
2	_	upplied by ALS?						and the same of th			
3	Did sample containers arrive in good condition?										
4	Were chain-of-custody papers used and filled out?										
5	Did sample container labels and/or tags agree with custody papers?										
6	Was sample volume received adequate for analysis?										
7	Are samples within specified holding times?										
8	Was proper temperature (thermal preservation) of cooler at receipt adhered to?										
Cooler Temperature: 3° C Blank Temperature: ° C											
9	Was a blank tube received?										
10	Were custody seals on outside of cooler/Box?										
	Location of seal(s)? Sea										
	Were signature and date included?										
	Were seals into										
	Were custody seals on outside of sample container?										
	Location of seal(s)? Sealing Lid										
	Were signature and date included?										
	Were seals intact?										
11											
	Is there a client indication that the submitted samples are pH preserved?										
	Were <u>VOA vials</u> checked for presence/absence of air bubbles?									_	
10	Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it?										
12	Tubes: Are the tubes capped and intact?										
	Do they contain moisture?										
13	Badges: Are the badges properly capped and intact? Are dual bed badges separated and individually capped and intact?										
		Are dual bed badg	ges separated a	na maiviauan	y capped and	intact?					
Lab	Sample ID	Container	Required	Received	Adjusted	VOA Headspac		pt / Pres		í	
		Description	pH *	pН	pН	(Presence/Absence)	Commer	its		
P1500074-001.01		Passive (Radiello H2S)									
P1500074-002.01 P1500074-003.01		Passive (Radiello H2S)									
21500074-003.01		Passive (Radiello H2S) Passive (Radiello H2S)									
		Passive (Radiello H2S)									
P1500074-006.01		Passive (Radiello H2S)									
P1500074	1-007.01	Passive (Radiello H2S)									
Explain any discrepancies: (include lab sample ID numbers):											

RESULTS OF ANALYSIS Page 1 of 1

Client: Tetra Tech, Incorporated

Client Project ID: West Lake Landfill / 103X9025140058 ALS Project ID: P1500074

Hydrogen Sulfide

Test Code: ALS AQL 110 Date(s) Collected: 1/5/15 Instrument ID: P-UV-Vis-01 Date Received: 1/8/15 Sue Anderson Analyst: Date Extracted: 1/21/15 Sampling Media: Radiello Tube(s) Date Analyzed: 1/21/15

Test Notes: Desorption Volume: 0.010 Liter(s)

		Sampling	,							
Client Sample ID	ALS Sample ID	Time	Dilution	Result	MRL	MDL	Result	MRL	MDL	Data
		Minutes	Factor	ng/Sample	ng/Sample	ng/Sample	μg/m³	μg/m³	μg/m³	Qualifier
WAA-01-RH-PS-20150105	P1500074-001	13129	1.0	340	570	110	0.53	0.88	0.17	Į,
WAA-02-RH-PS-20150105	P1500074-002	13070	1.0	240	570	110	0.37	0.89	0.17	, J
WAA-03-RH-PS-20150105	P1500074-003	13070	1.0	350	570	110	0.55	0.89	0.17	J
WAA-04-RH-PS-20150105	P1500074-004	13093	1.0	390	570	110	0.60	0.89	0.17	J
WAA-05-RH-PS-20150105	P1500074-005	13066	1.0	350	570	110	0.55	0.89	0.17	,J
WAA-04-RH-DU-20150105	P1500074-006	13093	1.0	400	570	110	0.62	0.89	0.17	J
WAA-00-RH-TB-20150105	P1500074-007	NA	1.0	ND	570	110	NA	NA	NA	
Method Blank	P150121-MB	NA	1.0	ND	570	110	NA	NA	NA	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

NA = Not applicable.

AGE, 110 MDL Als - PageNo

J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL. HVE 13 March 2918

RESULTS OF ANALYSIS Page 1 of 1

Client: Tetra Tech, Incorporated **Client Sample ID: Duplicate Lab Control Sample**

ALS Project ID: P1500074 West Lake Landfill / 103X9025140058 ALS Sample ID: P150121-LCS,

P150121-DLCS

Date Sampled: NA

Date Received: NA

Laboratory Control Sample/Duplicate Laboratory Control Sample Summary

Test Code: ALS AQL 110 Instrument ID: P-UV-Vis-01 Analyst: Sue Anderson Sampling Media:

Radiello Tube(s)

Date Analyzed: 1/21/15 Volume(s) Analyzed: NA

Test Notes:

Client Project ID:

	Spike Amount	Re	sult	% Re	covery	ALS	Relative		
Compound	LCS / DLCS µg/L	LCS μg/L	DLCS μg/L	LCS	DLCS	Acceptance Limits	Percent Difference	RPD Limit	Data Qualifier
Hydrogen Sulfide	500	536	538	107	108	73-129	1	5	

WLLFOIA4312 - 015 - 0156411

(ALS)	Envi	ronme	ental
Service R	lequest#	:_F15	00071

Hydrogen Sulfide (H2S) in Air Bench Sheet

ALS AQL 110

ice Request#: F1500071 <u>P190232</u> Prep Run #: 277 159

Run#: 42

1				ротименто на при при при при при при при при при при
Maccaldana				SECOND
Distriction		Ref#	Concentration (ug/L)	Exp. Date
STEPPERSONAL STREET	RAD 171 Stock	524-67151401	57250 ug/L	9/2/15
STATE OF THE PARTY OF	Sulfide ICV/CCV	524-04081401	<i>500</i> 425 ug/L	4/8/15
		Q900)	84112115	accesses grand grand and an of a constant accessors and a

			Coloring
Reagents	Reference or Lot#	Exp. Date	Solution
Ferric Chloride	524-0625/402	6/25/15	10 mL Ferric CI + 50
Amino Sulfuric	524-12311402	1//3///5	mL Amino Sulfuric prepped prior to
radiello Tube	14315	7	coloring step

Calibration Curve: RAD 171 diluted to volume with Deionized Water

					-				nd in a second			
10 mL aliquot of ea	ch Prep run	NA	0.05 / 50	0.10 / 50	0.20 / 50	0.50 / 50	0.75 / 50	1.0 / 50		Corr. Coeff		1-1.05
ug/L (ppl	0)	0	57.3	115	229	573	859	1145	- (0)	and any		E=1.05
Abs. @ 665	i nm	0.000	0.053	0.124	0,230	0.577	0.865	1.140	0.777	132643	5	-
		2.574725753a	279				Town I seemed	\$-768 4 ,8-01786-0	100000	Temp.	Corrected	
	Sampling	and the second s	Extract Volume		Blank Subtract	Absorbance @	Corrected	Result	Result	Result H₂S	Result	4
Sample ID	Time (mins)	Temp	(L)	Dilution	Abs.	665 nm	Abs.*	ug/L (ppb) _M A⁄	Ang/sample	ppbV**	ug/m³***	1
IG ,	Company of the Control of the Contro	- Major Agrange Control	***************************************	- California Street Street Street Street Street Street Street Street Street Street Street Street Street Street	C-year-manners,	0.000	0,000	-2.19/260	416	and the state of t		
IN 50019/L	- Indiana and A	STORESTON OF THE PROPERTY OF T	E_proportion/controls	· market part	Publications	0,508	0,508	507			1019	Þ
MBI	e nonest est	250	0.010	*STATE OF THE STATE (i) objections/projection	0.011	0,011	8.83 /411	6 2110				
M62	ं अवस्य कडार स्व	1	* The state of the	-1-manufactures	Near-englishman particular con-	0.011	0.011	8.83 /4/10	2 4/10		0	
145,5000914	AND CONTRACTOR			· Asset SC Comp. Park	0,011	0.578	0.567	565,687 336	196 5362		107%	7.21%
DUS I	No. of Control of Cont	1	The second secon	E-VERTER-STOPP	0.011	0.580	0.509	567.690/538.0	% 538/		108%] PPD
P1500074-1.01	131 29	-0.60	,	Section and the second	0.011	0.049	0.038	35.872	340.019	0.38	0.53	JRA
201	13070	· AND CONTROL CONTROL		nt restriction.	0.011	0.038	0.027	24.855	23593	0,26	0.37	Feedback Control of Control
-3.01	13070			energy.	0.01/	0.050	0.009	36874	349512	0.39	0.55	,
-4.01	13093	NAME OF TAXABLE PARTY.		Note that the second second second second second second second second second second second second second second	0.01/	0.054	0.043	40.380	387.486	043	0.60	CHRISTIAN CONTRACTOR
5.01	13066			vigot protesting	0.011	0.050	0,039	36.574	349.518	0.34	0.55	
L -601	12097	V	J	- MARINE STA	0.011	0.055	0.044	41.88	396.979	0.44	6.62	\sim
001 90091V	Name of Street, Street	Committee	A. Milliand States	et to the same of	The second of th	0.506	0,506	505	Source Source		1019	Vo -
COB!	Special Republication of the Control	anning/	· V2000000 74.000	~Argenties of	- Grand and the state of the st	0.000	0000	-2,19/211.0				1 28

Concentration after blank subtraction	(as	applicable)	į
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"Concentration after blank subtraction (as applicable)		/ -	
Comments: **H ₂ S in ppbV = ng H ₂ S / (0.096 ng/ppb min) x time in minutes; ***ug/m³ = ppbV H ₂ S x (34.09 MW of H ₂ S / 24.46 gas constant)	TEMP = (TAB)	
LCS (500 ug/L): spike tube with 0.5 ml of freshly prepped 10 ppm sulfide solution [0.0764g Sodium Sulfide 20 c/25/16 up to 1L with DI] up to 10 mL desorb volume	THE RESIDENCE THE PROPERTY OF	BUG.	,
Prepped By: 54 /21/15 (0. 1400)	SAMPUN	GEATE	
Analyzed By: 1/2///5 (0) 14/2()		_	

Prepped By: Analyzed By: Reviewed By:

RL = 570 mg MDC = 110 mg

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ALS Environmental

Hydrogen Sulfide (H₂S) in Air Bench Sheet ALS AQL 110

Service Request#: Prep Run #: 227

page 282 Run#: 439943

	Ref#	Concentration (ug/L)	Exp. Date
RAD 171 Stock	524 -09157401	57250 ug/L	9/2/15
Sulfide ICV/CCV	524-0408/401	425 ug/L	4/8/15
The state of the s	(WH)	UX 900 Spilling	e-manganes-re-remojaneans-remova-remova-

	The state of the s		Coloring
Reagents	Reference or Lot #	Exp. Date	Solution
Ferric Chloride	524-06251402	The same of the sa	10 mL Ferric CI + 50
Amino Sulfuric	524-12311402	1 1 1 2 1 1 1 5	mL Amino Sulfuric prepped prior to
radiello Tube	14315	1 1 * "	coloring step

Calibration Curve: RAD 171 diluted to volume with Deionized Water

10 mL aliquot of eac	ch Prep run	NA	0.05 / 50	0.10 / 50	0.20 / 50	0.50 / 50	0.75 / 50	1.0 / 50	K. Quanting and the state of th	Corr. Coef	f	_ i
ug/L (ppb))	0	57.3	115	229	573	859	1145	0.699	13764	8	10=1
Abs. @ 665	nm	0.00	0.053	0.124	0.230	0,577	0.865	1,140	MILEDARY	777		
	130000000000000000000000000000000000000				Market Company	25.5 (Sept. 12.1)	157740 3344		20001740	Temp.	Corrected	
Sample ID	Sampling Time (mins)	Temp	Extract Volume (L)	Dilution	Blank Subtract Abs.	Absorbance @ 665 nm	Corrected Abs.*	Result ug/L (ppb)	Result ng/sample	Result H ₂ S ppbV**	Result ug/m ³ ***	
P1500074-7,01	B	NA	0,010	A registration registration review.	0.011	0.012	0.001	-1.18/41,6	L//0			
11500232-1-01	20156	-1.70	* CTOMMENT OF THE PARTY OF THE	- Colifornia interpretational services and the services are services and the services and the services and the services and the services and the services and the services and the services and the services and the services and the services and the services and the services and the services and the services and the services and the services and the services and the services are services and the services and the services and the services and the services and the services and the services and the s	19,011	0.043	0.030	29.863	283,059	0,21	0,29	JF
-2.01	20165	No. of Concession, Name of Street, or other Desires, Name of Street, Original Property and Stree		*Ohrvanca E 1494/200**	0.011	0.036	0.025	22.852	2/6.606		0,22	
-3.01	20170		New York	- which the second seco	0.011	0,030	0.019	16.813	159.649	10,12	0.16	
-4.01	20164			"Sugar fill to the state of the	0.011	0.044	0.033	30.864	292.95	10,20	0,30.	
-5.01	20/6/			A STATE OF THE PARTY OF THE PAR	10.011	0,038	0.027	24.855	239,51	3017	0.24	7
1-6,01	20169	N.		Control of the second	10.011	0.038	0.027	24.859	239,54	30.17	0,24	
U -7.01	B	NA	V	- Africa Anagographicals	0.011	0.015	0.004	1.82/2/16	4/10		/	1_
1/1/2 2019/1		Монумунатта	A Augusta Salata	* Statement our ember*	Section of the sectio	0.504	0,504	503			1010	1/3
50BQ	A CONTRACTOR OF THE PARTY OF TH	No. of Concessions,	41277555	J-Wichwig Congression	- Standardischermingsdag	0.000	0.000	-2.19/211	6			7 4
ICV/CCV Accept	ance Criteria: 90	-110%		and the second section of the second section of the second section of the second section secti	**************************************			7			- Carlotte - Carlotte - Carlotte - Carlotte - Carlotte - Carlotte - Carlotte - Carlotte - Carlotte - Carlotte	
	tance Criteria: 73						7/20-40					1
RPD Acceptance							~~~					-
		the Bench S	heet may vary slight	dy than what is ren	orted due to sig figs	used for calculation	name.					
•			,, 30510	-, som mat is repr	orrea age to sig tigs	used for calculation	٦.					

*Concentration after blank subtraction (as applicable)			- \3'
Comments: ** H_2S in ppbV = $ng H_2S / (0.096 ng/ppb min) x time in minutes; ***ug/m^3 = ppbV$	H ₂ S x (34.09 MW of H ₂ S / 24.	46 gas constant) or operator = (3	78)
LCS (500 ug/L): spike tube with 0.5 ml of freshly prepped 10 ppm sulfide solution [0.0764g Sodium Sulfide	up to 1L with DIJ up to 1	0 mL desorb volume AFFLY TO RE	manager t
Prepped By:	Date / //2///5 (1)	400 saniouno	PATE
Analyzed By:	Date: //2//5 (8)	143Q	
Reviewed By: (AN)	Date:	122115	
		· · · · / · · · · · · · · · · · · · · ·	

524-03/8/40/ 500AMNOZ RICCA Chemical Combony Cat No 5444.5-4 LOTE 3403762 120 mlAnler glass Exp. 9/2014 20/40/ 0./NH2SOY H2SGY (EMD 49284; EXP. 1 22 W/DI 524-64081401 Methylene Blye 100 ml, Peurchased Methylene Blye Alla Lesar 101 11207010 EXP: 4/8/15 524-0408/402 0.1 NHZSOY 5.toml CONC HZSOY (OMD 49284; EV): 11/20/14) 1 2C W DIH 20 EXP: 11/20/14 534-0422140/ 1000PM Soz Stock 0.16919 N92503 (IT labor 1074410627; Ext.: 8/31/14 1100 NU WIDI H2O. EXP: 5/6/14

1:1 42504 25 ml Conc Hy Sty (EMO 49284; EXP: 11/20, 11/20/14 5.000 Sulfavilamide (ST Baker los 532618; EXP 116/16) DISSOLVED IN SOME CONC HCI (EMP LOT # 49260; CNP: 2/7/16) 1900M W/DIHZO 6.25 ml Core H2SUY COMB 49284; 2,5 ml DI lettar 1.6875g NN-AMETRY-14 F (AUSPILLE MURG, 8941V) EXP. IN ABOVE ACID Soln then 1:/42504 (SZ4-06757401) 072514

-d -1		
WINDAD	98/19 SAY-0408/40/ 0./N/HZSOY 5.6 M CONC. HZSOY (EM) 49284; CRP:11/20 124, W/DI, HZO	7
nld	121 WIDT HZO EM) 49284; EXP:11/20	
	EXP: 1/20/14	
	98/14 524-09081402 1.0NN904	
120/14	1 8.00 NAOH (EMD BUG 30569 12/13) 1 WOM	
	EXI 9/8/15	
	91194 504-09151401 H25, radje/6 stock	
rock	Dyrchasid Sigma Aldrich RAD 171 100 ml Amber GLASS	
(w)	101# 14279102 OFT # PAD 171 Proffeel 1:50 => 1.145 9/ml sulfiele	And the second s
	10 1 9/2/15 11 5 0/m 34/HCG	
	Calibration solution for Hydrogen Sulphide (code RAD171)	Ŋ.
	CAUTION: Do not swallow. Wash the hands thoroughly after use. Avoid contact with the eyes, skin and clothes. In case of contact with cycs, thush with large amounts of compine water for at least 15 minutes. See MSDS for compiler safety information.	
	Description Code RAD171 relieves you from the task of preparing the sodium sulfide standard solution for the calibration curve used for the determination or	
7/485	Hs by the cartridge code RAD170. Since sodium sulfide is deliquescent, its weight is not a primary standard and sodium sulfide solution need titration once prepared. Moreover thration must be repeated often due to the instability of diluted solution (one hour time is sufficient to decrease solfide corrent by 10%). Code RAD171 is a methylene bias concentrated solution that, once diluted 1:50, provides the same absorbance value at 650 nm of a sodium sulfide solution of with concentration 1:45 gm in 1-3 suffice ions. Tals concentration value has been chosen to obtain the highest sobstance value within the finearity range of the spectrophotometer. To obtain a complete califeration curve, just dilute the mother solution as shown in the table.	
	Solution mi of ni of water equivalent to	
	Code RAD171 allows you to prepare as many as 50 calibration curves.	
	Storage Store in original containers or other appropriately labeled, suitable containers. Kept in a coot, dry environment away from sources of heat code RAD171 solution is stable for at least one year.	
		e al marcol

1 524-12371401 11/ HZSOG 250ml DI+ 250ml CMC HZSOG (PMO 54174; ENP 11/7/19). LET COOL EXP: 12/31/15 14 Stowey ADD 6.25 R CONC HZSLY COMP - 54174; EXP: 11/7/19) TO 25 MI DI. LET CA DISCOVE [.68759 N.N-Dirithy]-1,4-phinylane diamina 0xalake (Aldulch MKBG8241V; exp. 5/24/16) IN ABOVE AUD SOLV. Then DILUTE TO SSOME W/ 1:/HZSOY (824-123/1401; exp. EXP: +2/3-1/31/19

Tetra Tech, Inc. DATA VALIDATION REPORT LEVEL II

Site:

West Lake Landfill Site, Bridgeton, Missouri

Laboratory:	ALS Environmental (Simi Valley, California)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	March 13, 2015
Sample Delivery Group (SDG):	P1500645
Sample Numbers:	WAA-01-RH-PS-20150213, WAA-02-RH-PS-20150213, WAA-03-RH-PS-20150213, WAA-04-RH-PS-20150213, WAA-04-RH-DU-20150213, WAA-05-RH-PS-20150213, and WAA-00-RH-TB-20150213
Matrix / Number of Samples:	5 Air Samples, 1 Field Duplicate Sample, and 1 Trip Blank
documents entitled "Contract Labor Methods Data Review" (9240.1-48) Packages from Subcontracted Labor in the applicable methods. The review was intended to identify apparent from the summary data pathat were found, and data qualificat	to the U.S. Environmental Protection Agency (EPA) Region 7 ratory Program National Functional Guidelines for Superfund Organic), June 2008. In addition, the Tetra Tech document "Review of Data bratories" (February 2002) was used along with other criteria specified by problems and quality control (QC) deficiencies that were readily ackage. The following sections discuss any problems or deficiencies tions applied because of non-compliant QC. The data review was boratory QC information submitted with the project-specific data
I, Harry Ellis, certify that all data v	alidation criteria outlined in the above-referenced documents were ade to the data accorded with those documents.
Hang N. Ell	13 March 2015
Certified by Harry Ellis, Chemist	Date

103I9025140058.000 I SDG P1500645

DATA VALIDATION QUALIFIERS

- U The analyte was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported sample quantitation limit, which is estimated.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

103I9025140058.000 2 SDG P1500645

DATA ASSESSMENT

Sample delivery group (SDG) P1500645 included five (5) environmental air (RadielloTM adsorbent tube) samples and two (2) QC samples (a field duplicate and a trip blank). Samples were analyzed for hydrogen sulfide via the laboratory's implementation of the manufacturer's method. The following summarizes the data validation that was performed.

VOLATILE ORGANIC COMPOUND ANALYSIS

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the accepted holding time of 30 days from sample collection by tube to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. Satisfactory LCS and field duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

No analytes were detected in the laboratory (method) and field blanks. No qualifications were applied.

IV. Laboratory Control Sample (LCS)

All results for the duplicate LCS were within QC limits.

V. Surrogates

Surrogates are not used in this analysis.

VI. Comments

Hydrogen sulfide was not detected in any of the field samples.

VII. Overall Assessment of Data

Overall data quality is acceptable, with no qualifications added. All data are usable as reported for their intended purposes.

103J9025140058,000 3 SDG P1500645

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2655 Park Center Dr., Suite A Simi Valley, CA 93065 T: +1 805 526 7161 F: +1 805 526 7270

www.alsglobal.com

LABORATORY REPORT

March 6, 2015

Rob Monnig Tetra Tech, Incorporated 415 Oak Street Kansas City, MO 64106

RE: West Lake Landfill / 103X9025140058

Dear Rob:

Enclosed are the results of the samples submitted to our laboratory on February 17, 2015. For your reference, these analyses have been assigned our service request number 1500645.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

By Sue Anderson at 5:03 pm, Mar 06, 2015

Sue Anderson Project Manager



2655 Park Center Dr., Suite A Simi Valley, CA 93065 T: +1 805 526 7161 F: +1 805 526 7270 www.alsglobal.com

Client: Tetra Tech, Incorporated

Project: West Lake Landfill / 103X9025140058

Service Request No: P1500645

CASE NARRATIVE

The samples were received intact under chain of custody on February 17, 2015 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Hydrogen Sulfide in Air (H₂S) Analysis

The samples were prepared in accordance with CAS AQL 110 for hydrogen sulfide in air and analyzed by colorimetric method using a spectrophotometer. This method is not included on the laboratory's NELAP, DoD-ELAP, or AIHA-LAP scope of accreditation.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution")without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.



2655 Park Center Dr., Suite A Simi Valley, CA 93065

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ALS Environmental - Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	838341
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	CA200007
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413- 14-5
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA01627201 4-4
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

RIGHT SOLUTIONS | RIGHT PARTNER

DETAIL SUMMARY REPORT

Client: Tetra Tech, Incorporated Service Request: P1500645

Project ID: West Lake Landfill / 103X9025140058

Date Received: 2/17/2015

AQL 110 - H2S Air Time Received: 13:30

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	CASA
WAA-01-RH-PS-20150213	P1500645-001	Air	2/13/2015	13:54	X
WAA-02-RH-PS-20150213	P1500645-002	Air	2/13/2015	13:03	\mathbf{x}
WAA-03-RH-PS-20150213	P1500645-003	Air	2/13/2015	13:30	X
WAA-04-RH-PS-20150213	P1500645-004	Air	2/13/2015	13:42	X
WAA-05-RH-PS-20150213	P1500645-005	Air	2/13/2015	13:16	X
WAA-01-RH-DU-20150213	P1500645-006	Air	2/13/2015	13:54	$\mathbf{X}_{\mathbb{R}^{n}}$
WAA-00-RH-TB-20150213	P1500645-007	Air	2/13/2015	14:13	X

Radiello - Chain of Custody Record & Analytical Service Request



2655 Park Center Drive, Suite A Simi Valley, California 93065 Phone (805) 526-7161

(ALS)	Fax (805) 52	6-7270			ound Time in Busir			ircle 💡	ALS Project No	P1500645	
			* .	1 Day (100%) 2 Day	ay (75%) 3 Day (50°	%) 4 Day (35%) 5		Day-Standard	<u> </u>	[1300043	
							ALS Contact:	11.2 8			
Company Name & Address (Rep	oorting Intorm	ation)		Project Name			Sue Anderson	45 4			
letra Tech I15 Oak Street.				West Lake Landfil		•	(NO 6	Analysis:	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)		
Cansas City, MO 64106				Project Number		-37		SO ₂ , O ₃ , VOC	s, Aldenyde,	_ ~	and.
		***************************************		103X9025140058				<u> Ammonia)</u>	-		
Project Manager				P.O. # / Credit Card	d / Billing Information	k sa na h					
Rob Monnig (816-412-1775) / D	g/	(314-517-67	98)	PO 1111500			Sulfide		-	Comments	
Phone	Fax			Attn: Emily Fishe	r		<u> </u>	1	The state of the s		
316-412-1775	816-410-174	8		415 Oak Street, Ka	ansas City, MO 641	06					
Email Address for Result Reporting							<u> </u>		all the second	**	
emily.fisher@tetratech.com				emily.fisher@tetra	tech.com]				
Client Sample ID	Laboratory ID Number	Date/Time Start	Date/Time End	Total Sampling Time (minutes)	Sampling Temp 25°C assumed if not specified	Radiello ID Sticker Number	Hydrogen				on Markey
WAA-01-RH-PS-20150213		2/4/15 @ 14:07	2/13/15 @ 13:54	12947	1.7	376ME	X				
WAA-02-RH-PS-20150213	2	2/4/15 @ 13:29	2/13/15 @ 13:03	12934	1.7	377ME	X			·	
WAA-03-RH-PS-20150213	3	2/4/15 @ 13:50	2/13/15 @ 13:30	12940	1.7	378ME	X			79.9	
NAA-04-RH-PS-20150213	4	2/4/15 @ 13:57	2/13/15 @ 13:42	12945	1.7	379ME	. ×				7.
VAA-05-RH-PS-20150213	5	2/4/15 @ 13:37	2/13/15 @ 13:16	12939	1.7	380ME	X		•		
WAA-01-RH-DU-20150213	6	2/4/15 @ 14:07	2/13/15 @ 13:54	12947	1.7	381ME	х				
VAA-00-RH-TB-20150213	-1	2/4/15 @ 14:14	2/13/15 @ 14:13	NA	NA	382ME	. x				9 x * ₄ ;
					,					<u>.</u>	
Report Tier ier I - (Results/Default if not specifier ier II (Results + QC)			Validation P	ackage) 10% Surch	V	EDD required Ye	\$	Chairpof Custoc	ty Seak (Circle) KEN ABSENT	Project Requirements (Mi	RLs, QAPP)
Reliquished by: (Signature)	u Ba	loeu	Date: 2-16-15	Time: 1315	Received b	y: (Signature)) by	Date:	Time:	, g	4
	in a	<i>(</i>	Date:	Time:		y: (Signature)	4-7	Date: 2/11/15	Time: 2/330		
Reliquished by: (Signature)	*		Date:	Time:	Received b	y: (Signature)	, K	Date:		Cooler / Blank 28	°C

WLLFOIA4312 - 015 - 0156425

ALS Environmental Sample Acceptance Check Form

Client:	Tetra Tech, In	ncorporated			_	Work order:	P1500645			
Project:	West Lake La	ndfill/103X9025140	058				•			
Sample(s) received on:	2/17/15			Date opened:	2/17/15	by:	KKEL	PE	
Note: This i	form is used for <u>al</u>	1 samples received by ALS.	The use of this fe	orm for custody s	eals is strictly me	eant to indicate pres	sence/absenceand r	ot as an ir	dication	of
compliance	or nonconformity	quired by the meth	od/SOP. <u>Yes</u>	<u>No</u>	<u>N/A</u>					
1	Were sample	containers properly n	narked with cli	ient sample ID	?					
2	Container(s) s	supplied by ALS?								de casa
3	Did sample co									
4	Were chain-o	of-custody papers used	and filled out	?						and the same of th
5	Did sample co	ontainer labels and/or	tags agree wi	th custody pap	ers?					
6	Was sample v	v olume received adequ	ate for analys	is?						
7	Are samples v	within specified holding	g times?							
8	Was proper to	emperature (thermal p	reservation) o	f cooler at rec	eipt adhered t	to?				- Carlotte
	Cooler Ten	nperature: 28° C Bl	ank Temperati	ure: ° C						
9	Was a blank	tube received?								
10	Were custody	y seals on outside of co	oler/Box?							
		Location of seal(s)?					Sealing Lid?			
	Were signatur	re and date included?								
	Were seals int	tact?								
	Were custody	seals on outside of sar	nple container	:?						
		Location of seal(s)?					Sealing Lid?			
	Were signatur	re and date included?						and the same of th		
	Were seals int	tact?						- Indiana		
11	Do containe	ers have appropriate pr	eservation, a	ccording to me	thod/SOP or	Client specified	l information?			
	Is there a clie	ent indication that the s	ubmitted samp	oles are pH pro	eserved?			- Constant		
	Were VOA v	vials checked for presen	nce/absence of	f air bubbles?						
	Does the clien	nt/method/SOP require	that the analy	st check the sa	mple pH and	if necessary alt	er it?	100000		
12	Tubes:	Are the tubes capp	ed and intact?)		-				
		Do they contain m	noisture?							
13	Badges:	Are the badges pr		and intact?				П		
15	_ uugost	Are dual bed badg	1 7 11		y capped and	intact?				
Lab S	Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence		pt / Pres Commer		
P1500645	5-001.01	Passive (Radiello H2S)								
P1500645		Passive (Radiello H2S)								
P1500645		Passive (Radiello H2S)								
21500645		Passive (Radiello H2S)								
P1500645 P1500645		Passive (Radiello H2S)								
P1500645		Passive (Radiello H2S) Passive (Radiello H2S)					+			
. 1500045	, 007.01	1 assive (Radiello 1123)								
Explair	ı any discrepanc	eies: (include lab sample l	ID numbers):							

RESULTS OF ANALYSIS
Page 1 of 1

Client: Tetra Tech, Incorporated

Client Project ID: West Lake Landfill / 103X9025140058 ALS Project ID: P1500645

Hydrogen Sulfide

Test Code: ALS AQL 110 Date(s) Collected: 2/13/15
Instrument ID: P-UV-Vis-01 Date Received: 2/17/15
Analyst: Sue Anderson Date Extracted: 2/26/15
Sampling Media: Radiello Tube(s) Date Analyzed: 2/26/15

Test Notes: Desorption Volume: 0.010 Liter(s)

Sampling Client Sample ID Time MRL ALS Sample ID Dilution Result **MDL** Result MRL MDL Data Minutes Factor ng/Sample ng/Sample ng/Sample $\mu g/m^3$ $\mu g/m^3$ $\mu g/m^3$ Qualifier WAA-01-RH-PS-20150213 P1500645-001 12947 1.0 ND 570 110 ND 0.87 0.17 12934 WAA-02-RH-PS-20150213 P1500645-002 1.0 ND 570 110 ND 0.17 0.87 P1500645-003 12940 1.0 ND 570 WAA-03-RH-PS-20150213 110 ND 0.87 0.17 WAA-04-RH-PS-20150213 P1500645-004 12945 1.0 ND 570 110 ND 0.17 0.87 P1500645-005 12939 1.0 ND 570 WAA-05-RH-PS-20150213 110 ND 0.87 0.17 WAA-01-RH-DU-20150213 P1500645-006 12947 1.0 ND 570 110 ND 0.87 0.17 WAA-00-RH-TB-20150213 P1500645-007 NA 1.0 ND 570 110 NΛ NΛ NΛ Method Blank P150226-MB NA 1.0 ND 570 1:10 NA NΛ NA

> HUE 13 March 2915

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

 $N\Lambda = Not applicable.$

RESULTS OF ANALYSIS Page 1 of 1

Client: Tetra Tech, Incorporated **Client Sample ID: Duplicate Lab Control Sample**

ALS Project ID: P1500645 **Client Project ID:** West Lake Landfill / 103X9025140058 ALS Sample ID: P150226-LCS,

P150226-DLCS

Date Sampled: NA

Date Received: NA

Date Analyzed: 2/26/15

Laboratory Control Sample/Duplicate Laboratory Control Sample Summary

Test Code: ALS AQL 110 P-UV-Vis-01 Instrument ID: Analyst: Sue Anderson Sampling Media:

R

Test Notes:

Radiello Tube(s)	Volume(s) Analyzed: NA

	Spike Amount	Re	sult	% Re	covery	ALS	Relative		
Compound	LCS / DLCS µg/L	LCS µg/L	DLCS μg/L	LCS	DLCS	Acceptance Limits	Percent Difference	RPD Limit	Data Qualifier
Hydrogen Sulfide	500	535	530	107	106	73-129	1	5	

(ALS) Environmental Service Request#: P1500645

Hydrogen Sulfide (H₂S) in Air Bench Sheet

AQL 110

	Ref#	Concentration (ug/L)	Exp. Date
RAD 171 Stock	524 -09/52401	57250 ug/L	91415
Sulfide ICV/CCV	534-04081401	元C 425 u g/L	4/8/15
2010 15 July 10 July 1	CHU V	D 8-218611 8-	the form on most after the way of the color

			Coloring
Reagents	Reference or Lot #	Exp. Date	Solution
Ferric Chloride	524-06251402	6/25/15	10 mL Ferric CI + 50
Amino Sulfuric	524-02101302	- 417711 C	mt Amino Sulfuric prepped prior to
radiello Tube	143/5		coloring step

Calibration Curve: RAD 171 diluted to volume with Deionized Water

		7	1			 	T	I				1
10 mL aliquot of ea	ich Prep run	NA	0.05 / 50	0.10 / 50	0.20 / 50	0.50 / 50	0.75 / 50	1.0 / 50		Corr. Coeff		
ug/L (ppl	0)	0	57.3	115	229	573	859	1145	D. 999 DECOPPECA	893471		1.000
Abs. @ 665	5 nm	0,000	0.055	0.124	0.246	0.58/	0.868	1.148	De 100	on (15	DES	1,095
	fableste tysk lig	19 mg - 2	Control China Fina				7587732707485555	204045 E.S.	DE GATTECH	Temp.	Corrected	1
	Sampling		Extract Volume		Diank Subtract	Absorbance @	Corrected	Result	Result	Result H₂S	Result	
Sample ID	Time (mins)	Temp	(L)	Dilution	Abs.	665 nm		ug/L (ppb)	ng/sample	ppbV**	ug/m ³ ***	
166				- A	12,000	0,000	-5.53/211.6				Ω	
TW 500 19/L		· parameters	*_englishments	- 10	0-500	0.500	494				99 1/0	
MBI	- Commence of the Commence of	25°C	0.010	Parameter Contraction of the Con), management committee	0.011	0.011	5.45 /2/16	4110			
MB2 6 1	/ Harthamaton Company	1	42-monthson	Transpose services		0.011	0.011	5.45/41.6	1410			
115 5009/4	*: #250000 25020 Stopps			Calleton Communication Communi	0,011	0.582	0,571	54,53 5391	535/		1070/0	1621%
DUS I	***Tomperon.orgide	1	To Constitute of the Constitut	Company of the second	0.011	0.577	0.566	559.51 5303	6 930 3		106%	1 40
P1900645-1.01	12947	1.700	·	* such fibrouping,	0.011	0.028	6.017	11.4/41.6	2110	40.13	10.17	
2.0/	12934			S-manufacture and section 11	0.011	6.021	0.010	4.45/11.6	4110	20.13	10,17	
1-3.01	12940		TO THE THE THE THE THE THE THE THE THE THE	Name of the Owner, where the Owner, where the Owner, where the Owner, where the Owner, where the Owner, where the Owner, where the Owner, where the Owner, where the Owner, where the Owner, where the Owner, where the Owner, where the Owner, where the Owner, where the Owner, where the Owner, where the Owner, where the Owner, which is the Owner, where the Owner, which is the Owner, whic	0.011	0.025	0.014	8.45/11.6	2110	20,13	20,17	
-4:01	12945			Scotland Company	0.01/	0.028	0.017	11.47411	2110	20.13	20.17	
-5.01	12939		*D****	Nagaritation in the second	0.011	0,000	0,009	3,46 /4/116	2110	10.13	10.17	
V-6.01	12947	U	J	No. of Confession Confession	0.011	0,020	0.009	3.46/211.1	1110	40113	. LO.17/	
MU/ 50049/L	**: NO SECULIAR DE CONTROL DE CON	- programming	, which in the control of the contro	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	No. of Concession, Name of	0,497	0.497	491			9870	2
CCBI	- Andrews of the second	-	despera	Commence	Committee	0.000	0.000	-5.53/41	<u> </u>		*	3.8
*Companies offer black								/		*77	MP W	**************************************

Comments:**H ₂ S in ppbV = ng H ₂ S / (0.096 ng/ppb · min) x time in minutes;	***ug/m 3 = ppbV H ₂ S x (34.09 MW of H ₂ S / 24.46 gas constant) ²	ZERRECTION	298
CS (500 µg/l): spike tube with 0.5 ml of freshly prepped 10 ppm sulfide solution (0.0764g Sc			· commentered to the second	-

Prepped By: Analyzed By: Reviewed By:

Date:

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ALS) Environmental

Hydrogen Sulfide (H2S) in Air Bench Sheet

AQL 110

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OCIVICE NEGUES	<i>tt</i> .	1 6 71328 6 2		
		1 - 1 - 2		-
Service Reques	# :	1700402	11 001	_

To comment	and the second s			
POLITICISMOS		Ref#	Concentration (ug/L)	Exp. Date
Terratories (RAD 171 Stock	524-69151401	57250 ug/L	9/2/15-
(Acceptant)	Sulfide ICV/CCV	524-0408401	500 425 ug/L	4/8//5
	100 m 100 m	CHECK THE	X SAV Hotal.	tanapagi ng mani dan panda sa mananananan nan

			Coloring
Reagents	Reference or Lot #	Exp. Date	Solution
Ferric Chloride	524-06251402	6/25/15	10 mL Ferric CI + 50
Amino Sulfuric	94/02/01502	12 //0// 8	mE Amino Sulfuric prepped prior to
radiello Tube	14315		coloring step

Calibration Curve:	RAD 171 dil	uted to v	olume with De	ionized Wate	<u>r</u>	·			ţ	1	
10 mL aliquot of ea	ich Prep run	NA	0.05 / 50	0.10 / 50	0.20 / 50	0.50 / 50	0.75 / 50	1.0 / 50		Corr. Coeff	F
ug/L (ppl	0)	0	57.3	115	229	573	859	1145	0.900	989297	7
Abs. @ 665	nm	0.000	0.055	0.124	0.246	0.581	0.868	1.148	10.00	91071	061
									918652 × 1100 × 1	Temp	Corrected
	Sampling	Willy produced and the second	Extract Volume		Blank Subtract	Absorbance @	Corrected	Result	Result	Result H ₂ S	Result
Sample ID	Time (mins)	Temp	(L)	Dilution	Abs.	665 nm	Abs.*	ug/L (pp/b)	ng/sample	ppbV**	ug/m ³ ***
P1500645-7.01	Ø		0.010	* CONTRACTOR :	0.011	0.012	0.001	-4.53/4116	4110		
P1500733-1.01	10026	-7,20	Version and an observed discovering	**Tecroscopicsonicsonics	0.011	0.018	0.007	1.46/11/6	4110	20,18	20, 25
2.01	10024			New York Comments	0.011	0,035	0.024	18.431	174,706	0.28	0,39
1-3.01	10022		and the same of th	of the constant of the Constant	0.011	0.023	0.012	6.45/41.6	410	20.18	10,25
4.01	10028			and the second second	0.011	10019	0.008	2.46/14	9 1	20,18	40,25
-5.0	10024			* Company	0.011	0-017	0.006	0.46/211	6	20,18	10.2
1-6.0/	110028	J		Section of	0.011	0.018	0.007	1.46/416	6	20,18	60.20
V -7.01	\$		U		0.011	0.0/2	0.001	-4.55/41	6 1		—
2012		Military.	gylatern	Description,	4-2000-00-00-00-00-00-00-00-00-00-00-00-0	0.495	0.495	489			984
202	4 Sandarde America	and the second second second	Sections to the section .	*convenient desiry	and the second s	0.000	0.000	-5,53/41.	6		
	A CONTRACTOR OF THE CONTRACTOR			Control of the contro	annual Constitution of the			l	TO THE PERSON OF		
ICV/CCV Acceptant LCS/DLCS Acceptant						-					· · · · · · · · · · · · · · · · · · ·
RPD Acceptance Ci		43/0									
		e Bench Shee	et may vary slightly t	han what is reporte	ed due to sig figs use	ed for calculation.					
		L		Management of Agreement of the Control of the Contr	Activities - The Control of the Cont	formation and the second and the sec	<u> </u>	<u></u>	<u></u>		

*Concentration after blank subtraction (as applicable)

Comments: $**H_2S$ in ppbV = ng H_2S / (0.096 ng/ppb	<u>min) x time in minutes;</u>	***ug/m 3 = ppbV H ₂ S x	(34.09 MW of H ₂ S / 24.46 ga	s constan

LCS (500 ug/L): spike tube with 9:51ml of freshly prepped 10 ppm sulfide solution [0.0764g Sodium Sulfide_ Prepped By:_

Analyzed By: Reviewed By:

up to 1L with DI] up to 10 mL desorb volume Date:

Date: Date:

92

132	
	524-03181401 500AM NO2
3/18/14	Pychased 11 Children
: - SO	RICCA Chemical Company CATNO 5444.5-4
	LOTE 2403760 120 ml Km ler year
	15xp. 7/2014
3/20/14	524-03201401 0-1NH2807
	5.6 M CM H2804 (EMD 49284; ESP:
	11/20/14) 1 22 W/DE
	EX1: 11/20/14
4814	524-6408/401, Methylene Blue 2% doly
9	100 nl, purchased Sight 250000 12
Transition of the state of the	Alla ACSUS LOT 10206010
	NA. ILISTIC
	EN1 9/9/3
HRIM	524-04081402 01N#2804
S- 3	5.6ml Couc H2504 (OMD 49284; EP:
	11/20/14) 9 2CW/ WIHZO-
	EXP: Upoliy
4/92/14	524-04221401 1000PM Soz Stack
8	0.15919 NO2502 (IT laber 1014/10677: Ext. 8/31)
1	word was the
 	EXP: 5/6/14

		149
		524/02041501 0.1NH2SUY 5.6 ml Cone H2SOY (DMO 54174; EXP: 11/7/14 12L W/DJ H2O EXP: 2/4/16
	2/4/15	5.6 ml Cone, H2 Soy (DMO 54174; EXP: 11/7/14
	ON	12L W/DI #20
		EXP: 2/4/16
		and provided the store
	11415	524-02041502 1000 MM NH3 STORE
	Sa	524-02041502 1000 MM NH3 Stoad 0.3141gr MH4C1 (EMD WJ 11C; EXP. 6/5/19) 1 100 Ml W/ SZY-02041501.
		DXP: 8/4/18
	144	524-62051501 0./NH2SOY 1.
	TO	504-0205150 0.1 N HZSU (56 ml Cinc H7SUy (and 54174; asp: 1/7/19)
121		12LW/DIHO
		exp: 3/5/16
	-1-1	
	2/10/17	524-02/0/501 1:180504
	So	250 M DI + 250M CMCH2SOY,
		(em) 94174; ext. 11/1/19, (et co)
		CKP! 2/10/16
	3/m/a	534-02101502 AMINE SOLO
	414/13	STONEY ADD 6.25 ml Com 4250-1 (OMD 54174)
		EN: 11/4/19) to 2.5 Ml DI 420. let Cool 1
		DISSOLVE 1.68759 NN-DINCHIY- 1,4- shen ylenediarine oxalake
		Aldrich MKB4824W; EXP: 5/24/16) IN ABOVE ACAD SOLV: THEN
		Silve to 28010 W/ 1:142504 (524-02101501; 52110/16)
	l .	STIPLE STOLLS TO PORCHEMENT
		J. Muncey Vir. Toolog

Tetra Tech, Inc. DATA VALIDATION REPORT LEVEL II

Site:

West Lake Landfill Site, Bridgeton, Missouri

Laboratory	ALC Environmental (Cimi Vallay, California)
Laboratory:	ALS Environmental (Simi Valley, California)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	March 13, 2015
Sample Delivery Group (SDG):	P1500733
Sample Numbers:	WAA-01-RH-PS-20150220, WAA-02-RH-PS-20150220, WAA-03-RH-PS-20150220, WAA-04-RH-PS-20150220, WAA-04-RH-DU-20150220, WAA-05-RH-PS-20150220, and WAA-00-RH-TB-20150220
Matrix / Number of Samples:	5 Air Samples, 1 Field Duplicate Sample, and 1 Trip Blank
documents entitled "Contract Labora Methods Data Review" (9240.1-48) Packages from Subcontracted Labora in the applicable methods.	to the U.S. Environmental Protection Agency (EPA) Region 7 atory Program National Functional Guidelines for Superfund Organic, June 2008. In addition, the Tetra Tech document "Review of Data ratories" (February 2002) was used along with other criteria specified problems and quality control (QC) deficiencies that were readily
apparent from the summary data pacthat were found, and data qualificati	ckage. The following sections discuss any problems or deficiencies ions applied because of non-compliant QC. The data review was boratory QC information submitted with the project-specific data
	didation criteria outlined in the above-referenced documents were de to the data accorded with those documents.
Hang N. Elli	
, , ()	13 March 2015
Certified by Harry Ellis, Chemist	Date

103I9025140058.000 1 SDG P1500733

DATA VALIDATION QUALIFIERS

- U The analyte was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported sample quantitation limit, which is estimated.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

103I9025140058.000 2 SDG P1500733

DATA ASSESSMENT

Sample delivery group (SDG) P1500733 included five (5) environmental air (RadielloTM adsorbent tube) samples and two (2) QC samples (a field duplicate and a trip blank). Samples were analyzed for hydrogen sulfide via the laboratory's implementation of the manufacturer's method. The following summarizes the data validation that was performed.

VOLATILE ORGANIC COMPOUND ANALYSIS

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the accepted holding time of 30 days from sample collection by tube to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. Satisfactory LCS and field duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

No analytes were detected in the laboratory (method) and field blanks. No qualifications were applied.

IV. Laboratory Control Sample (LCS)

All results for the duplicate LCS were within QC limits.

V. Surrogates

Surrogates are not used in this analysis.

VI. Comments

The only detected result in the field samples was less than the sample reporting limits, which correspond to the lowest calibration standard. The laboratory correctly qualified this result as estimated and flagged it "J".

VII. Overall Assessment of Data

Overall data quality is acceptable, with no qualifications added. All data are usable as reported for their intended purposes.

103J9025140058,000 3 SDG P1500733

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2655 Park Center Dr., Suite A Simi Valley, CA 93065 T: +1 805 526 7161 F: +1 805 526 7270

www.alsglobal.com

LABORATORY REPORT

March 6, 2015

Rob Monnig Tetra Tech, Incorporated 415 Oak Street Kansas City, MO 64106

RE: West Lake Landfill / 103X9025140058

Dear Rob:

Enclosed are the results of the samples submitted to our laboratory on February 24, 2015. For your reference, these analyses have been assigned our service request number 1500733.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions inlease call me at (805) 526-7161

By Sue Anderson at 5:07 pm, Mar 06, 2015

Sue Anderson Project Manager



2655 Park Center Dr., Suite A Simi Valley, CA 93065 T: +1 805 526 7161 F: +1 805 526 7270

www.alsglobal.com

Client: Tetra Tech, Incorporated

Project: West Lake Landfill / 103X9025140058

Service Request No: P1500733

CASE NARRATIVE

The samples were received intact under chain of custody on February 24, 2015 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Hydrogen Sulfide in Air (H₂S) Analysis

The samples were prepared in accordance with CAS AQL 110 for hydrogen sulfide in air and analyzed by colorimetric method using a spectrophotometer. This method is not included on the laboratory's NELAP, DoD-ELAP, or AIHA-LAP scope of accreditation.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution")without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.



2655 Park Center Dr., Suite A Simi Valley, CA 93065

T: +1 805 526 7161 F: +1 805 526 7270 www.alsglobal.com

ALS Environmental - Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	838341
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-001
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413- 14-5
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA01627201 4-4
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

RIGHT SOLUTIONS | RIGHT PARTNER

DETAIL SUMMARY REPORT

Client: Tetra Tech, Incorporated Service Request: P1500733

Project ID: West Lake Landfill / 103X9025140058

Date Received: 2/24/2015 Time Received: 16:15

AQL 110 - H2S Air

			Date	Time	$\left egin{array}{c} \mathbf{S} \\ \mathbf{A} \end{array} \right $
Client Sample ID	Lab Code	Matrix	Collected	Collected	CA
WAA-01-RH-PS-20150220	P1500733-001	Air	2/20/2015	13:00	X
WAA-02-RH-PS-20150220	P1500733-002	Air	2/20/2015	12:07	
WAA-03-RH-PS-20150220	P1500733-003	Air	2/20/2015	12:32	X
WAA-04-RH-PS-20150220	P1500733-004	Air	2/20/2015	12:50	
WAA-05-RH-PS-20150220	P1500733-005	Air	2/20/2015	12:20	X
WAA-04-RH-DU-20150220	P1500733-006	Air	2/20/2015	12:50	X
WAA-00-RH-TB-20150220	P1500733-007	Air	2/20/2015	13:10	X

Radiello - Chain of Custody Record & Analytical Service Request



2655 Park Center Drive, Suite A Simi Valley, California 93065 Phone (805) 526-7161

	Fax (805) 52	6-7270		Requested Turnar	equested Turnaround Time in Business Days (Surcharges) please circle ALS Project No.								
			в.	1 Day (100%) 2 Da	ay (75%) 3 Day (50%	%) 4 Day (35%) 5	Day (25%) 10 I	Day-Standard		1130013	? 7		
				MANAGEMENT AND AND AND AND AND AND AND AND AND AND			ALS Contact:						
Company Name & Address (Re	porting Inform	ation)		Project Name		*	Sue Anderson						
etra Tech				West Lake Landfil	n de la companie de l			Analysis:	5 <u>.</u>				
15 Oak Street, lansas City, MO 64106				Project Number	AND AND AND AND AND AND AND AND AND AND		(e.g. NO₂, S	O_2 , O_3 , VOC	s, Aldehyde,		, T		
ansas Chy, MO 04100				103X9025140058				-Ammonia)	,	a.			
roject Manager	****			P.O. # / Credit Card	d / Billing Information			No.					
tob Monnig (816-412-1775) / [Dave Kinroth	(314-517-67	98)	PO 1111500			<u>ğ</u>		٠	Comme	ents		
hone	Fax			Attn: Emily Fishe			Į	3					
16-412-1775	816-410-174	8		415 Oak Street, Ka	ansas City, MO 641	06	Sc						
mail Address for Result Reporting							0		`				
mily.fisher@tetratech.com		40444		emily.fisher@tetra	Character and the contract of		<u></u> 2		فتضفين يتريده				
Client Sample ID	Laboratory ID Number	Date/Time Start	Date/Time End	Total Sampling Time (minutes)	Sampling Temp 25°C assumed if not specified	Radiello ID Sticker Number	Hydrogen Sulfide				alitic.		
VAA-01-RH-PS-20150220		2/13/15 @ ₂ 13:54	2/20/15 @ 13:00	10026	-7.2	197MH	X.						
VAA-02-RH-PS-20150220		2/13/15 @ 13:03	2/20/15 @ 12:07	10024	-7.2	198MH	×						
VAA-03-RH-PS-20150220		2/13/15 @ 13:30	2/20/15 @ 12:32	10022	-7.2	196MH	X -			Auditention control and an analysis of the control and analysis of the control and an analysis of the control and an analysis of the control and an analysis of the control and an analysis of the control and an analysis of the control and an analysi			
VAA-04-RH-PS-20150220		2/13/15 @ 13:42	2/20/15 @ 12:50	10028	-7.2	199MH	×				and the second s		
VAA-05-RH-PS-20150220		2/13/15 @ 13:16	2/20/15 @ 12:20	10024	-7.2	194MH	X			A A A STATE A STATE A A STATE A ST			
VAÁ-04-RH-DU-20150220		2/13/15 @ 13:42	2/20/15 @ 12:50	10028	-7.2	195MH	X			* ************************************			
VAA-00-RH-TB-20150220		2/13/15 @ 12:54	2/20/15 @ 13:10	NA NA	NA	193MH	, X			-	#. C. 3.		
					(Valentia de la companio del la companio del la companio de la comp				<u>.</u>		
Report Tie ier I - (Results/Default if not specific ier II (Results + QC)	r Levels - ple	ase select of Tier III (Data Tier V (clier	a Validation F	Package) 10% Surch	arge	EDD required Ye	95	INTACT BRO	dy Seak (Circle)	Project Requirements	s (MRLs, QAPP)		
Reliquished by: (Signature)	1 Boul	eu .	Date: ユ/丸3/15	<u>างรู้จะสาดเลยสายสายสายสายสายสายสายสายสายสายสายสายสาย</u>			10 EX	Date:	Time:	i.	ě.		
	10 60		Date:	Time:		by: (Signature)		Date: 2/24/15	Time: 16/5	(W)	ice		
Reliquished by: (Signature)		openojenje vorove venisti da 1845 (1888) 1886 (1888) 1886 (1888)	Date:	Time:	Received to	oy: (Signature)	÷ ÷	Date:	Time:	Cooler / Blank Temperature	°C		
	*	*	•		**								

WLLFOIA4312 - 015 - 0156443

ALS Environmental Sample Acceptance Check Form

Client:	Tetra Tech, In	ncorporated			_	Work order:	P1500733			
Project:	West Lake La	mdfill/103X9025140	058		-					
Sample((s) received on	: 2/24/15			Date opened:	2/24/15	by:	KKEL	PE	
<i>Note:</i> This	form is used for al	amples received by ALS.	The use of this f	orm for custody s	eals is strictly me	eant to indicate prese	nce/absenceand n	ot as an ir	dication	of
ompliance	or nonconformity	. Thermal preservation and	pH will only be e	valuated either at	the request of th	e client and/or as req	uired by the meth			
								<u>Yes</u>	<u>No</u>	<u>N/A</u>
1	_	containers properly n	narked with cli	ient sample ID	?					Arronan
2	Container(s)	supplied by ALS?								- Annual Control
3	Did sample c	ontainers arrive in goo	od condition?							
4	Were chain-o	of-custody papers used	and filled out	?						
5	Did sample c	ontainer labels and/or	tags agree wi	th custody pap	ers?					
6	Was sample	v olume received adequ	ate for analys	is?						
7	Are samples v	within specified holding	g times?							and the same of th
8	Was proper to	emperature (thermal p	reservation) o	f cooler at rec	eipt adhered t	to?		- Constant		
9	Was a trip bl	ank received?								
10	Were custody	y seals on outside of co	oler/Box?							
		Location of seal(s)?					Sealing Lid?			
	Were signatur	re and date included?					_			
	Were seals in									
		seals on outside of sar	mple container	r?						41004
		Location of seal(s)?	_				Sealing Lid?			
	Were signatur	re and date included?								
	Were seals in									
11		ers have appropriate pr	eservation a	ccording to me	ethod/SOP or	Client specified	information?			
11		ent indication that the s		_		Chefit specified	miorination.			
		vials checked for presen	_							
	•				111	:6	:40			_
		nt/method/SOP require	•		шріе рн апа	ii necessary ane	r II.?			
12	Tubes:	Are the tubes capp		(ALLEGO CONTRACTOR OF THE PARTY
		Do they contain m								
13	Badges:	Are the badges pr	1 7 11							
		Are dual bed badg	ges separated a	and individual	y capped and	intact?				
Lab	Sample ID	Container	Required	Received	Adjusted	VOA Headspace	Recei	pt / Pres	ervation	ı
		Description	pH *	pН	pН	(Presence/Absence)		Commer		
P150073	3-001.01	Passive (Radiello H2S)				2				
P150073	3-002.01	Passive (Radiello H2S)								
	3-003.01	Passive (Radiello H2S)								
	3-004.01	Passive (Radiello H2S)								
	3-005.01	Passive (Radiello H2S)								
	3-006.01 3-007.01	Passive (Radiello H2S) Passive (Radiello H2S)					+			
130073.	3-007.01	rassive (Radiello 1125)					1			
Г- 1 '	3.		ID1 >	<u> </u>	<u> </u>		1			
Explai	n any discrepand	cies: (include lab sample l	iD numbers):							

RESULTS OF ANALYSIS Page 1 of 1

Client:

Tetra Tech, Incorporated

Client Project ID: West Lake Landfill / 103X9025140058

ALS Project ID: P1500733

Hydrogen Sulfide

Test Code:

ALS AQL 110

Instrument ID:

P-UV-Vis-01

Analyst:

Sue Anderson

Sampling Media: Radiello Tube(s)

Test Notes:

Date(s) Collected: 2/20/15

Date Received: 2/24/15

Date Extracted: 2/26/15

Date Analyzed: 2/26/15

Desorption Volume:

0.010 Liter(s)

		Sampling								
Client Sample ID	ALS Sample ID	Time	Dilution	Result	MRL	MDL	Result	MRL	MDL	Data
		Minutes	Factor	ng/Sample	ng/Sample	ng/Sample	μg/m³	μg/m³	μg/m³	Qualifier
WAA-01-RH-PS-20150220	P1500733-001	10026	1.0	ND	570	110	ND	1.3	0.25	
WAA-02-RH-PS-20150220	P1500733-002	10024	1.0	170	570	110	0.39	1.3	0.25	J
WAA-03-RH-PS-20150220	P1500733-003	10022	1.0	ND	570	110	ND	1.3	0.25	
WAA-04-RH-PS-20150220	P1500733-004	10028	1.0	ND	570	110	ND	1.3	0.25	
WAA-05-RH-PS-20150220	P1500733-005	10024	1.0	ND	570	110	ND	1.3	0.25	
WAA-04-RH-DU-20150220	P1500733-006	10028	1.0	ND	570	110	ND	1.3	0.25	
WAA-00-RH-TB-20150220	P1500733-007	NA	1.0	ND	570	110	NA	ΝΛ	NA	
Method Blank	P150226-MB	NA	1.0	ND	570	110	NA	NΛ	NA	

HUE 13 March 2915

 $N\Lambda = Not applicable.$

P1800743 AOU 110 1503031055 SC vis - Samule

AOL, 110 MDL vis - PageNo

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

RESULTS OF ANALYSIS
Page 1 of 1

Client: Tetra Tech, Incorporated
Client Sample ID: Duplicate Lab Control Samp

Client Sample ID:Duplicate Lab Control SampleALS Project ID: P1500733Client Project ID:West Lake Landfill/103X9025140058ALS Sample ID: P150226-LCS,

P150226-DLCS

Laboratory Control Sample/Duplicate Laboratory Control Sample Summary

Test Code:ALS AQL 110Date Sampled: NAInstrument ID:P-UV-Vis-01Date Received: NAAnalyst:Sue AndersonDate Analyzed: 2/26/15Sampling Media:Radiello Tube(s)Volume(s) Analyzed: NA

Test Notes:

	Spike Amount	Re	esult	% Re	covery	ALS	Relative		
Compound	LCS / DLCS µg/L	LCS µg/L	DLCS μg/L	LCS	DLCS	Acceptance Limits	Percent Difference	RPD Limit	Data Qualifier
Hydrogen Sulfide	500	535	530	107	106	73-129	1	5	

Hydrogen Sulfide (H2S) in Air Bench Sheet

AQL 110

ALS Environmental Service Request#:

A standard of the standard of	PROPERTY OF THE PROPERTY OF TH		7
	5 ("		
	Ref#	Concentration (ug/L)	Exp. Date
RAD 171 Stock	534 -09/52401	57250 ug/L	91415
Sulfide ICV/CCV	534-04081401	<i>気</i> 乙 425 u g/L	4/8/15
CONSTRUCTION OF A STATE OF THE PROPERTY OF THE	CHUV	8-3/36/15	7

Reagents	Reference or Lot #	Exp. Date	Coloring Solution
Ferric Chloride	CONTRACTOR OF THE PROPERTY OF	incomplement	10 mL Ferric CI + 50
Amino Sulfuric	524-02101502	J 1153166	mt Amino Sulfuric prepped prior to
radiello Tube	143/5	09/15	coloring step

Calibration Curve:	RAD 171 di	uted to v	olume with De	ionized Wate	r	\$						
10 mL aliquot of ea	ach Prep run	NA	0.05 / 50	0.10 / 50	0.20 / 50	0.50 / 50	0.75 / 50	1.0 / 50		Corr. Coeff	f	
ug/L (pp	b)	0	57.3	115	229	573	859	1145	n 099	892976	<u> </u>	1. 500
Abs. @ 665	5 nm	0.000	0.055	0.124	0,246	0.581	0.868	1.148	DETERMENT	901	DES	1,095
		Section 1	250000000000000000000000000000000000000						VE 307 7-C 31	Temp.	Corrected	
Sample ID	Sampling Time (mins)	Temp	Extract Volume (L)	Dilution	Blank Subtract Abs.	Absorbance @ 665 nm	Corrected Abs.*, Mi)	Result ug/L (ppb)	Result ng/sample	Result H ₂ S ppbV**	Result ug/m³***	
126			- New Contract Contra	— <i>9</i>	12,000	0,000	-5.53/211.6				Ω	
TW 909/L		: Security of the last of the		- 10	0-500	0.500	494				9910	
MBI		250	0,010		hamman and	0.011	0.011	5.45 /6/16	4110		CONTRACTOR OF THE PROPERTY OF	
MB2 6 1	i distribution of the second	Calconstanting .		**PEOD-GORGO OPPORT	Land Str. Springer Str. Str.	0.011	403 1 4	5.45/41.6				1
115 9009/-	**************************************			- Company of the Comp	0,011	0.582	0,571	54,53 5391	K		1070/0	16 21%
DUS I	and the second second second	V		And the state of t	0.011	0.577	0.566	559.54 530.3	6 530 3		106%	S RA
P1900645-1.01	12947	1.70		* - water to the same to	0.011	0.028	6.017	11.4/211.6	2110	20.13	10.17	
2.01	12934			Commission	0.011	6.021	0.010	4.49/11.6	410	20.13	10,17	-
-3.01	12940			Separation Participations	0.011	0.025	0.014	8.45/11.6	2110	10,13	20,17	
-4:01	12945			elicoteophysia.	0.011	0.028	0.017	11.4741,6	2110	20.13	20.17	Ì
-5.0/	12939			Negotiga populari di marina.	0.011	0,020	0,009	3,46 /4/16	2110	10.13	20.17	L
V-6.0/	12947	V		E-min -	0.011	0.030	0.009	3.46/211	2410	40,13	20.17/	\mathcal{D}
MUI 500 VOIC	*: NA 2011 DE	-y American de Carrella de Carrella de Carrella de Carrella de Carrella de Carrella de Carrella de Carrella de	partition of the same of the s		A second contract con	0.497	0.497	491			987	þ
CCBI	- component and the same of the same	And Continues of the Co	4 Medical Control	Commence of the Commence of th	Company	0.000	0,000	-5.53/41.			,	3.8
*Concentration after bla	nk subtraction (as applicabi	le)			-		/		778	EMP = (Y	- \
Commonto:**LI C in		10//00	OC nalanh : no	in) is time a in a	aim	·/m3 - nnh\/ 1	104/24/00/	MANAL OF LL C / C	A AC 000 00	anatont CES 4	RELITION 1-50	2₽ I

Comments:** H_2S in ppbV = ng H_2S / (0.096 ng/ppb min) x time in minutes; ***ug/m³ = ppbV H_2S x (34.09 MW of H_2S / 24.46 gas constant) LCS (500 ug/L): spike tube with 0.5 ml of freshly prepped 10 ppm sulfide solution [0.0764g Sodium Sulfide] Prepped By:_ Analyzed By: Date: Reviewed By:_

91

ALS) Environmental

Hydrogen Sulfide (H₂S) in Air Bench Sheet **AQL 110**

ANNOUND BY AND AND AND THE SERVICE	Control of the spin of the spi	N. S. S. S. S. S. S. S. S. S. S. S. S. S.
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Service Request#:_	mental PIGNO	× 245		AQL 11		Sheet Prep Run #:_	2304	4/	Run #:	1347	MY 79 198	B2
						Reagents Ferric Chloride Amino Sulfuric radiello Tube	Reference 594 - 063 594 - 037 (594 - 143 15	5140,2	Exp. Date 6/25/15 3/10/15	Coloring Solution 10 mL Ferric CI + 50 mL Amino Sulfuric prepped prior to coloring step	The region of the control of the con	
10 mL aliquot of each Prep run NA 0.05 / 50 0.10 / 50 0.20 / 50 0.50 / 50 0.75 / 50 1.0 / 50 ug/L (ppb) 0 57.3 115 229 573 859 1145 Abs. @ 665 nm 0.000 0.055 0./ 24 0.346 0.58/ 0.868 /./46									0,999	Corr. Coeff 89297	1	1,05T
Sample ID P1500645-701 P1500733-101 -3.01 -4.01 -6.01 0.02 0.02	Sampling Time (mins) 1003 6 1003 7 10032 10038 1003 4 1003 8	Temp -7.2°C	Extract Volume (L)	Dilution		Absorbance @ 665 nm 0.010 0.018 0.036 0.036 0.037 0.017 0.018 0.010 0.495 0.000	Corrected Abs.* 0.001 0.007 0.024 0.018 0.006 0.007 0.007 0.007 0.007 0.007	Result ug/L (ppp) -4.53/41.6 1.46/41.6 18.43/ 6.45/41.6 2.46/41.6 1.46/41.		Result H ₂ S ppbV** 20,18 0,28 20,18 20,18 20,18	Result ug/m³*** Lo, Z/s 0)39 Lo, 2/s Lo, 2/s Lo, 2/s Lo, 2/s Lo, 2/s Lo, 2/s	
*Concentration after blant Comments: **H ₂ S in LCS (500 ug/L): spike tut Prepped By: Analyzed By: Reviewed By:	nce Criteria: 73 – 1 criteria: < 5% as calculated on the hold subtraction (a hopbV = ng F hobe with 0.5 ml o	ne Bench Sheet L L as applicable H ₂ S / (0.09	96 ng/ppb mii	in) x time in m	ninutes; ***ug	ı/m³ = ppbV H ulfide	up to Date:up to	1L with DIJ up to	4.46 gas co	onstant) core	LECTION (2) PPLY TO QUE MILINGS	198) 3 198) 2 1247 E

92

132	
115	24-03/8/40/ 500AMNO2
3/18/14	Pychased 19 CH
	RICCA Chemical Company Cat No 5444.5-4
	LOT# 2403762 120 ml Amber glas
	T. 4/2014
3/20/14	524-0320/401 0./NH2801
h 5	6 M CM H2804 (EMD 49284; ESP;
	1/20/14) 1 22 W/DE
12-5	28/1: 11/20/14
4/8/14/3	524-6408/401 Methodeno Blue 20/2 80h
	sont, purchased sign 325,600 is to
	the resur 101 1202010
	VA: ILI VI
4	17, 9, 9, 5
4814	324-04081402 01N#2804
5	tom Con H2504 (DMD 49284; EV)
1	120/14) 1 2CW/ WIHZO
E	=XP: 11/20114
4/02/14 5	34-04221401 joruppu Soz Stocle
0.16	1919 NO2502 (IT laber 15 4410677: Ext. 8/31)
1	onlwol H20.
I EX	P: 5/6/14

			49
12	L.	594/07041501 0.1NH2SUY 5.6 ml Conc. H2SOY (DMD 54174; EXP: 11/- 12L W/DJ HZO EXP: 2/4/16	
	14/15	5.6 ml Cone, H2 Soy (DMD 54174; EXP: 11/	7/14
	- OSL	12L W/DF 420	
	Teles !	526-020(1187)2 1MO DOM 1142 S	foaç
	11415	0.3141g MH4CI / END WJIIC; EXP: 6/5/1	<u> </u>
7	760	524-02041502 1000 MM NH3 ST 0.3141g MH4C1 (EMD WJ 11C; EXP. 6/5/19 1 10000 W/ SZY-02041501.	<i>- </i>
		DKP: 8/4/15	
	4545	56 ml Cove Hy Sty COMO 54174; 00.1 1/3	1
7	1.Sa	5.6 m Cinc H7 Sy (and 54174) and 11/9	7/ 9
124		CXO: 2/5/1/	
		er. 45/16	······································
	2/10/1	524-02101501 1:1 \$2504	
	12	250 Ml DI + 250ml Cinc H2804	<u></u>
		como 54174; exp: 11/7/19.) let Go!	
411		EXP! 0/10/16	······································
	2/10/1	534-0201502 AMINE Solo	en en en en en en en en en en en en en e
Let the	414/13	STORY ADD 6.25 ml Car H250-1 COMO 54174	<u></u>
		EN! 11/19) to 2.5 Ml DI 420. let Col)
		DISSOLVE 1.68459 N.N. Drucky 1- 1,4- phen y lenediarine oxa	like
		Aldrich MEBUSOW ; EXP: 5/24/16) IN ABOVE ACID SOLV. THO	V -
		EXI: Shotto Abolt	<u> </u>
		ON HARIT IN WREET EXP POPERENCE	